

ORDER NO. KMS0012014S3

Service Manual

DIGITAL SUPER HYBRID SYSTEM

KX-TD1232AL
(for Australia)

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WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

Panasonic

1. CHANGES

1.1. Subject

Suffix	Reason for suffix change
N → O	Change of the software. (IC20/IC21:ROM Ver. P121M/P122M → P121N/P122N)
O → P	Change of the CPU board. (PQUP10441YB → PQUP10441YC)

1.2. Suffix location

(Example)



1.3. REPLACEMENT PARTS LIST

Reason for Change (Symbol A) Following 1-8 reasons are indicated on the Notes in the bottom column.

- 1. Improve performance
- 2. Change of material or dimension
- 3. To meet approved specification
- 4. Standardization
- 5. Addition
- 6. Deletion
- 7. Correction
- 8. Other

Remark:

1. Part with mark '1' has not changed on the Supplement G.

Interchangeability code (Symbol B) Following V-Z interchangeabilities are indicated on the Notes in the bottom column.

Parts	Set Production	Description
V	Original Early (before change) New Late (after change)	Original or new parts may be used in early or late production sets. Use original parts until exhausted, then stock new parts.
W	Original Early (before change) New Late (after change)	Original parts may be used in early production sets only. New parts may be used in early or late production sets. Use original parts where possible. Then stock new parts.
X	Original Early (before change) New Late (after change)	New parts only may be used in early or late production sets. Stock new parts.
Y	Original Early (before change) New Late (after change)	Original parts may be used in early production sets only. New parts may be used in late production sets only. Stock both original and new parts.
Z	Other	

Ref. No.	Parts No.		Part Name & description	Pcs	Remarks	Notes	Time c change (Suffix)
	Original Part	New part					

ACCESSORIES AND PACKING MATERIALS

	PSQX1291X	PSQX1291W	ADDITIONAL USER MANUAL	1		1	X	O
	PSQX1339Y	PSQX1399Y	ADDITIONAL USER MANUAL	1		7		

PU BOARD PARTS (All parts are shown below.)

CB1	PSWP11232AL1	PSWP11232AL2	CPU BOARD ASS'Y (RTL)	1		1	V	P
:1	PQVI68301FCG	PQVI68301FCG	IC	1	*1			
:2	PQVI620890F	PQVI620890F	IC	1	*1			
:3	PQVIMT8980DE	PQVIMT8980DE	IC	1	*1			
:6, IC7	PQVIMC45503P	PSVIMC14548V	IC	2		5		P
:8	PQVIMC45503P	PSVIMC14548V	IC	1		1	Y	P
:9	PQVISV7860SG	PQVISV7860SG	IC	1	*1			
:10, IC11	PQVINJM4558D	-----	IC	0		6		P
:12, IC14	PQVINJM4558D	PQVINJM4558D	IC	2	*1			
:13	PQVIPS520C	PSVIPS600CMT	IC	1		1	Y	P
:15	PQVIHD75188P	PQVIHD75188P	IC	1	*1			
:16	PQVIHD75189P	PQVIHD75189P	IC	1	*1			
:17	PSVITC7HT00A	PSVITC7HT00A	IC	1	*1			
:18	PQVISN7L00S	PQVISN7L00S	IC	1	*1			
:19	PSWI21232AL2	PSWI21232AL2	IC (ROM)	1	*1			
:20, IC21	PSWI11232A10	PSWI11232A11	IC (ROM KIT)	1		1	X	O
:22, IC23	PSVILHP832DD	-----	IC	0		6		P
:24	PSVICX582MD	PSVITC5401AE	IC	1		1	Y	P
:25	PSVICX582MD	PSVITC5401AE	IC	1		1	Y	P
:26	PQVIMS6242BS	PQVIMS6242BS	IC	1	*1			
:27	PQVINJM4558D	PQVINJM4558D	IC	1	*1			
:29	PQVISN7L368M	PQVISN7L368M	IC	1	*1			
:31	PQVISN7L640M	PQVISN7L640M	IC	1	*1			
:32	PQVISN7L365S	PQVISN7L365S	IC	1	*1			
:33, IC34	PQVISN7L368M	PQVISN7L368M	IC	2	*1			
:35	PQVISN7L365S	PQVISN7L365S	IC	1	*1			
:36	PQVIMB7HU04F	PQVIMB7HU04F	IC	1	*1			
:37	PQVITC7H00F	PQVITC7H00F	IC	1	*1			
:38	PQVISN7H74S	PQVISN7H74S	IC	1	*1			
:39	PQVISN7L151M	PQVISN7L151M	IC	1	*1			
:40	-----	PQVISN7L32S	IC	1		5	Y	P
5	PQVDTA144EK	PQVDTA144EK	TRANSISTOR (SI)	1	*1			
6	2SC2412K	2SC2412K	TRANSISTOR (SI)	1	*1			
7	2SC2412K	2SC2412K	TRANSISTOR (SI)	1	*1			
8	PQVDTA143E	PQVDTA143E	TRANSISTOR (SI)	1	*1			

9	PQVTDTC144E	PQVTDTC144E	TRANSISTOR (SI)	1	*1			
10	2SA933	2SA933	TRANSISTOR (SI) (or 2SA1317)	1	*1			
11	2SC2412K	2SC2412K	TRANSISTOR (SI)	1	*1			
12	2SC2878	2SC2878	TRANSISTOR (SI)	1	*1			
13	2SC2412K	2SC2412K	TRANSISTOR (SI)	1	*1			
14	2SC2878	2SC2878	TRANSISTOR (SI)	1	*1			
601	PQVTDTA144EK	PQVTDTA144EK	TRANSISTOR (SI)	1	*1			
602	PQVTDTC144E	PQVTDTC144E	TRANSISTOR (SI)	1	*1			
603	PQVTDTA144EK	PQVTDTA144EK	TRANSISTOR (SI)	1	*1			
604	PQVTDTC144E	PQVTDTC144E	TRANSISTOR (SI)	1	*1			
605	-----	PQVTDTC144E	TRANSISTOR (SI)	1		5		P
606	-----	2SB1237R	TRANSISTOR (SI)	1		5		P
607	-----	PQVTDTC143E	TRANSISTOR (SI)	1		5		P
1	MA4091	MA4091	DIODE (SI)	1	*1			
3	MA723	MA723	DIODE (SI)	1	*1			
4	PQVDAK03	PQVDAK03	DIODE (SI)	1	*1			
7~D10	MA4068	-----	DIODE (SI)	0		6		P
11, D12	RLS71	RLS71	DIODE (SI)	2	*1			
13, D14	MA4030	MA4030	DIODE (SI)	2	*1			
15	MA4056	MA4056	DIODE (SI)	1	*1			
16, D17	RLS71	RLS71	DIODE (SI)	2	*1			
20, D21	MA723	MA723	DIODE (SI)	2	*1			
4	PQ4R10XJ471	ERJ3GEYJ471	RESISTOR, 470Ω	1		1	Y	P
5	PQ4R10XJ472	ERJ3GEYJ472	RESISTOR, 4.7kΩ	1		1	Y	P
6	PQ4R10XJ223	ERJ3GEYJ223	RESISTOR, 22kΩ	1		1	Y	P
7	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10kΩ	1		1	Y	P
8	PQ4R10XJ683	ERJ3GEYJ683	RESISTOR, 68kΩ	1		1	Y	P
10	PQ4R10XJ224	ERJ3GEYJ224	RESISTOR, 220kΩ	1		1	Y	P
11	PQ4R10XJ681	ERJ3GEYJ681	RESISTOR, 680Ω	1		1	Y	P
12	PQ4R10XJ393	ERJ3GEYJ393	RESISTOR, 39kΩ	1		1	Y	P
13	PQ4R10XF1782	ERJ3GEYJ183	RESISTOR, 18kΩ	1		1	Y	P
14	PQ4R10XJ104	ERJ3GEYJ104	RESISTOR, 100kΩ	1		1	Y	P
15	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10kΩ	1		1	Y	P
16	PQ4R10XJ274	ERJ3GEYJ274	RESISTOR, 270kΩ	1		1	Y	P
17	PQ4R10XJ183	ERJ3GEYJ183	RESISTOR, 18kΩ	1		1	Y	P
18	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10kΩ	1		1	Y	P
19	PQ4R10XJ561	ERJ3GEYJ561	RESISTOR, 560Ω	1		1	Y	P
20	PQ4R10XJ105	ERJ3GEYJ105	RESISTOR, 1MΩ	1		1	Y	P
21	PQ4R10XJ563	ERJ3GEYJ623	RESISTOR, 62kΩ	1		1	Y	P
22	PQ4R10XJ104	ERJ3GEYJ913	RESISTOR, 91kΩ	1		1	Y	P
23	PQ4R10XJ104	ERJ3GEYJ134	RESISTOR, 130kΩ	1		1	Y	P
24	PQ4R10XJ124	ERJ3GEYJ154	RESISTOR, 150kΩ	1		1	Y	P
25	PQ4R10XJ823	-----	RESISTOR, 82kΩ	0		6		P

26	PQ4R10XJ104	-----	RESISTOR, 100k Ω	0		6		P
27	PQ4R10XJ104	-----	RESISTOR, 100k Ω	0		6		P
28	PQ4R10XF1211	ERJ3GEYF122	RESISTOR, 1.2k Ω	1		1	Y	P
29	PQ4R10XF1211	-----	RESISTOR, 1.21k Ω	0		6		P
30	PQ4R10XJ224	ERJ3GEYJ224	RESISTOR, 220k Ω	1		1	Y	P
31	PQ4R10XF1401	-----	RESISTOR, 1.4k Ω	0		6		P
32	PQ4R10XJ823	ERJ3GEYJ154	RESISTOR, 150k Ω	1		1	Y	P
33	PQ4R10XJ472	ERJ3GEYJ472	RESISTOR, 4.7k Ω	1		1	Y	P
34	PQ4R10XJ333	ERJ3GEYJ333	RESISTOR, 33k Ω	1		1	Y	P
35	PQ4R10XJ104	ERJ3GEYJ104	RESISTOR, 100k Ω	1		1	Y	P
36	PQ4R10XJ124	ERJ3GEYJ124	RESISTOR, 120k Ω	1		1	Y	P
37	PQ4R10XJ104	ERJ3GEYJ563	RESISTOR, 56k Ω	1		1	Y	P
38	PQ4R10XJ104	ERJ3GEYJ104	RESISTOR, 100k Ω	1		1	Y	P
39	PQ4R10XJ124	ERJ3GEYJ124	RESISTOR, 120k Ω	1		1	Y	P
40	PQ4R10XJ104	ERJ3GEYJ104	RESISTOR, 100k Ω	1		1	Y	P
48	PQ4R10XJ333	ERJ3GEYJ333	RESISTOR, 33k Ω	1		1	Y	P
50	PQ4R10XJ224	ERJ3GEYJ224	RESISTOR, 220k Ω	1		1	Y	P
51	PQ4R10XJ333	ERJ3GEYJ333	RESISTOR, 33k Ω	1		1	Y	P
52	PQ4R10XJ472	ERJ3GEYJ472	RESISTOR, 4.7k Ω	1		1	Y	P
53	PQ4R10XJ104	ERJ3GEYJ104	RESISTOR, 100k Ω	1		1	Y	P
57	PQ4R10XJ102	ERJ3GEYJ102	RESISTOR, 1k Ω	1		1	Y	P
59	PQ4R10XJ104	ERJ3GEYJ563	RESISTOR, 56k Ω	1		1	Y	P
61	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
62	PQ4R10XJ223	ERJ3GEYJ223	RESISTOR, 22k Ω	1		1	Y	P
65	PQ4R10XJ561	ERJ3GEYJ561	RESISTOR, 560 Ω	1		1	Y	P
66	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
67	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
68	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
69	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
70	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
71	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
72	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
73	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
74	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
75	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
76	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
77	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
78	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
79	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
83	PQRD1VJ151	PQRD1VJ151	RESISTOR, 150 Ω	1	*1			P
84	PQ4R10XJ152	ERJ3GEYJ152	RESISTOR, 1.5k Ω	1		1	Y	P
85	PQ4R10XJ681	ERJ3GEYJ681	RESISTOR, 680 Ω	1		1	Y	P
87	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
91	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P

92	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
93	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
94	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
96	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
97	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
110	PQ4R10XJ470	ERJ3GEYJ470	RESISTOR, 47 Ω	1		1	Y	P
111	PQ4R10XJ470	ERJ3GEYJ470	RESISTOR, 47 Ω	1		1	Y	P
112	PQ4R10XJ470	ERJ3GEYJ470	RESISTOR, 47 Ω	1		1	Y	P
113	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
114	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
115	PQ4R10XJ222	ERJ3GEYJ222	RESISTOR, 2.2k Ω	1		1	Y	P
116	PQ4R10XJ472	ERJ3GEYJ472	RESISTOR, 4.7k Ω	1		1	Y	P
117	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
118	PQ4R10XJ333	ERJ3GEYJ333	RESISTOR, 33k Ω	1		1	Y	P
119	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
120	PQ4R10XJ334	ERJ3GEYJ334	RESISTOR, 330k Ω	1		1	Y	P
121	PQ4R10XJ222	ERJ3GEYJ222	RESISTOR, 2.2k Ω	1		1	Y	P
122	PQ4R10XJ472	ERJ3GEYJ472	RESISTOR, 4.7k Ω	1		1	Y	P
123	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
124	PQ4R10XJ333	ERJ3GEYJ333	RESISTOR, 33k Ω	1		1	Y	P
125	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
126	PQ4R10XJ334	ERJ3GEYJ334	RESISTOR, 330k Ω	1		1	Y	P
127	PQ4R10XJ472	ERJ3GEYJ472	RESISTOR, 4.7k Ω	1		1	Y	P
128	PQ4R10XJ472	ERJ3GEYJ472	RESISTOR, 4.7k Ω	1		1	Y	P
129	PQ4R10XJ470	ERJ3GEYJ470	RESISTOR, 47 Ω	1		1	Y	P
130	PQ4R10XJ470	ERJ3GEYJ470	RESISTOR, 47 Ω	1		1	Y	P
131	PQ4R10XJ470	ERJ3GEYJ470	RESISTOR, 47 Ω	1		1	Y	P
132	PQ4R10XJ470	ERJ3GEYJ470	RESISTOR, 47 Ω	1		1	Y	P
133	PQ4R10XJ470	ERJ3GEYJ470	RESISTOR, 47 Ω	1		1	Y	P
134	PQ4R10XJ390	ERJ3GEYJ390	RESISTOR, 39 Ω	1		1	Y	P
135	PQ4R10XJ470	ERJ3GEYJ470	RESISTOR, 47 Ω	1		1	Y	P
136	PQ4R10XJ470	ERJ3GEYJ470	RESISTOR, 47 Ω	1		1	Y	P
137	PQ4R10XJ470	ERJ3GEYJ470	RESISTOR, 47 Ω	1		1	Y	P
138	PQ4R10XJ101	ERJ3GEYJ101	RESISTOR, 100 Ω	1		1	Y	P
139	PQ4R10XJ101	ERJ3GEYJ101	RESISTOR, 100 Ω	1		1	Y	P
140	PQ4R10XJ101	ERJ3GEYJ101	RESISTOR, 100 Ω	1		1	Y	P
141	PQ4R10XJ101	ERJ3GEYJ101	RESISTOR, 100 Ω	1		1	Y	P
142	PQ4R10XJ101	ERJ3GEYJ101	RESISTOR, 100 Ω	1		1	Y	P
143	PQ4R10XJ101	ERJ3GEYJ101	RESISTOR, 100 Ω	1		1	Y	P
144	PQ4R10XJ101	ERJ3GEYJ101	RESISTOR, 100 Ω	1		1	Y	P
145	PQ4R10XJ101	ERJ3GEYJ101	RESISTOR, 100 Ω	1		1	Y	P
146	PQ4R10XJ470	ERJ3GEYJ470	RESISTOR, 47 Ω	1		1	Y	P
147	PQ4R10XJ470	ERJ3GEYJ470	RESISTOR, 47 Ω	1		1	Y	P
148	PQ4R10XJ470	ERJ3GEYJ470	RESISTOR, 47 Ω	1		1	Y	P

193	PQ4R10XJ560	ERJ3GEYJ560	RESISTOR, 56 Ω	1		1	Y	P
194	PQ4R10XJ560	ERJ3GEYJ560	RESISTOR, 56 Ω	1		1	Y	P
195	PQ4R10XJ560	ERJ3GEYJ560	RESISTOR, 56 Ω	1		1	Y	P
196	PQ4R10XJ560	ERJ3GEYJ560	RESISTOR, 56 Ω	1		1	Y	P
197	PQ4R10XJ560	ERJ3GEYJ560	RESISTOR, 56 Ω	1		1	Y	P
198	PQ4R10XJ560	ERJ3GEYJ560	RESISTOR, 56 Ω	1		1	Y	P
199	PQ4R10XJ560	ERJ3GEYJ560	RESISTOR, 56 Ω	1		1	Y	P
200	PQ4R10XJ560	ERJ3GEYJ560	RESISTOR, 56 Ω	1		1	Y	P
201	PQ4R10XJ102	ERJ3GEYJ102	RESISTOR, 1k Ω	1		1	Y	P
202	PQ4R10XJ102	ERJ3GEYJ102	RESISTOR, 1k Ω	1		1	Y	P
203	PQ4R10XJ102	ERJ3GEYJ102	RESISTOR, 1k Ω	1		1	Y	P
204	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
205	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
206	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
207	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
208	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
209	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
210	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
211	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
212	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
213	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
214	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
215	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
216	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
217	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
218	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
219	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
220	PQ4R10XJ223	ERJ3GEYJ223	RESISTOR, 22k Ω	1		1	Y	P
221	PQ4R10XJ222	ERJ3GEYJ222	RESISTOR, 2.2k Ω	1		1	Y	P
222	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
223	PQ4R10XJ223	ERJ3GEYJ223	RESISTOR, 22k Ω	1		1	Y	P
224	PQ4R10XJ105	ERJ3GEYJ105	RESISTOR, 1M Ω	1		1	Y	P
225, R226	PQ4R10XJ330	ERJ3GEYJ330	RESISTOR, 33 Ω	2		1	Y	P
227	PQ4R10XJ223	ERJ3GEYJ223	RESISTOR, 22k Ω	1		1	Y	P
228	PQ4R10XJ103	ERJ3GEYJ103	RESISTOR, 10k Ω	1		1	Y	P
229	PQ4R10XJ560	ERJ3GEYJ560	RESISTOR, 56 Ω	1		1	Y	P
601, R602	PQ4R10XJ104	ERJ3GEYJ104	RESISTOR, 100k Ω	2		1	Y	P
603	PQ4R10XJ331	ERJ3GEYJ331	RESISTOR, 300 Ω	1		1	Y	P
604	PQ4R10XJ151	ERJ3GEYJ151	RESISTOR, 150 Ω	1		1	Y	P
605	PQ4R10XJ824	ERJ3GEYJ824	RESISTOR, 820k Ω	1		1	Y	P
606	PQ4R10XJ223	ERJ3GEYJ223	RESISTOR, 22k Ω	1		1	Y	P
608	PQ4R10XJ124	ERJ3GEYJ124	RESISTOR, 120k Ω	1		1	Y	P
609	PQ4R10XJ223	ERJ3GEYJ223	RESISTOR, 22k Ω	1		1	Y	P
610, R611	PQ4R10XJ223	ERJ3GEYJ223	RESISTOR, 22k Ω	2		1	Y	P

704	-----	ERJ3GEYJ103	RESISTOR, 10kΩ	1		5		P
705	-----	PQRD1VJ220	RESISTOR, 22Ω	1		5		P
706	-----	ERJ3GEY0R00	RESISTOR, 0Ω	1		5		P
707	-----	ERJ3GEYJ561	RESISTOR, 560Ω	1		5		P
709	-----	ERJ3GEYJ472	RESISTOR, 4.7kΩ	1		5		P
715	-----	ERJ3GEY0R00	RESISTOR, 0Ω	1		5		P
1	PQ4R10XJ000	ERJ3GEY0R00	RESISTOR, 0Ω	1		1	Y	P
3, J6	PQ4R10XJ000	ERJ3GEY0R00	RESISTOR, 0Ω	2		1	Y	P
16	PQ4R10XJ223	ERJ3GEYJ223	RESISTOR, 22kΩ	1		1	Y	P
1	EECFE5R5474	EECFE5R5474	CAPACITOR, 0.47 μ F	1	*1			
2	ECEA1EU4R7	ECEA1EU4R7	CAPACITOR, 4.7 μ F	1	*1			
3	ECEA1HN3R3S	ECEA1HN3R3S	CAPACITOR, 3.3 μ F	1	*1			
8	ECQV1H104JZ	ECQV1H104JZ	CAPACITOR, 0.1 μ F	1	*1			
9	ECQV1H104JZ	ECQV1H104JZ	CAPACITOR, 0.1 μ F	1	*1			
11	PQCUV1E104MD	PQCUV1H105JC	CAPACITOR, 1 μ F	1		1	Y	P
12	PQCUV1H101JC	ECUV1H101JCV	CAPACITOR, 100pF	1		1	Y	P
13	PQCUV1H682KB	-----	CAPACITOR, 0.0068 μ F	0		6		P
14	PQCUV1H680JC	ECUV1H680JCV	CAPACITOR, 68pF	1		1	Y	P
16	PQCUV1H101JC	ECUV1H101JCV	CAPACITOR, 100pF	1		1	Y	P
17	PQCUV1E104MD	-----	CAPACITOR, 0.1 μ F	0		6		P
19	PQCUV1H101JC	ECUV1H101JCV	CAPACITOR, 100pF	1		1	Y	P
20	PQCUV1H332KB	ECUV1H332KBV	CAPACITOR, 0.0033 μ F	1		1	Y	P
21	PQCUV1E104MD	-----	CAPACITOR, 0.1 μ F	0		6		P
22	PQCUV1H101JC	ECUV1H101JCV	CAPACITOR, 100pF	1		1	Y	P
23	PQCUV1H101JC	ECUV1H101JCV	CAPACITOR, 100pF	1		1	Y	P
24	PQCUV1H332KB	ECUV1H332KBV	CAPACITOR, 0.0033 μ F	1		1	Y	P
25	PQCUV1E104MD	ECUV1C104KBV	CAPACITOR, 0.1 μ F	1		1	Y	P
26	PQCUV1E104MD	ECUV1C104KBV	CAPACITOR, 0.1 μ F	1		1	Y	P
27	PQCUV1H102J	ECUV1H102KBV	CAPACITOR, 0.001 μ F	1		1	Y	P
28	PQCUV1E104MD	ECUV1C104KBV	CAPACITOR, 0.1 μ F	1		1	Y	P
29	PQCUV1H101JC	ECUV1H101JCV	CAPACITOR, 100pF	1		1	Y	P
30	PQCUV1E104MD	ECUV1C104KBV	CAPACITOR, 0.1 μ F	1		1	Y	P
31	PQCUV1H102J	ECUV1H102KBV	CAPACITOR, 0.001 μ F	1		1	Y	P
33	-----	ECUV1C104KBV	CAPACITOR, 0.1 μ F	1		5	Y	P
34	-----	ECUV1C104KBV	CAPACITOR, 0.1 μ F	1		5	Y	P
35	PQCUV1H223KB	ECUV1C104KBV	CAPACITOR, 0.1 μ F	1		1	Y	P
36	PQCUV1H223KB	ECUV1C104KBV	CAPACITOR, 0.1 μ F	1		1	Y	P
37	PQCUV1H223KB	ECUV1C104KBV	CAPACITOR, 0.1 μ F	1		1	Y	P
38	PQCUV1H223KB	ECUV1C104KBV	CAPACITOR, 0.1 μ F	1		1	Y	P
39	PQCUV1H200JC	ECUV1H200JCV	CAPACITOR, 20pF	1		1	Y	P
40	PQCUV1H223KB	ECUV1H223KBV	CAPACITOR, 0.022 μ F	1		1	Y	P

41	PQCUV1H223KB	ECUV1H223KBV	CAPACITOR, 0.022 μ F	1		1	Y	P
42	PQCUV1H223KB	-----	CAPACITOR, 0.022 μ F	0		6		P
43	PQCUV1H223KB	-----	CAPACITOR, 0.022 μ F	0		6		P
44	PQCUV1H223KB	ECUV1H223KBV	CAPACITOR, 0.022 μ F	1		1	Y	P
45	PQCUV1H223KB	ECUV1H223KBV	CAPACITOR, 0.022 μ F	1		1	Y	P
46	PQCUV1H223KB	ECUV1H223KBV	CAPACITOR, 0.022 μ F	1		1	Y	P
47	PQCUV1H223KB	ECUV1H223KBV	CAPACITOR, 0.022 μ F	1		1	Y	P
50	ECEA1AU331	ECEA1AU331	CAPACITOR, 330	1	*1			
53	PQCUV1H180JC	ECUV1H180JCV	CAPACITOR, 18pF	1		1	Y	P
54	PQCUV1H180JC	ECUV1H180JCV	CAPACITOR, 18pF	1		1	Y	P
55	PQCUV1H223KB	ECUV1H223KBV	CAPACITOR, 0.022 μ F	1		1	Y	P
56	PQCUV1H223KB	ECUV1H223KBV	CAPACITOR, 0.022 μ F	1		1	Y	P
59	ECEA1HU010	ECEA1HU010	CAPACITOR, 1 μ F	1	*1			
60	ECEA1HU010	ECEA1HU010	CAPACITOR, 1 μ F	1	*1			
61	ECEA1HU010	ECEA1HU010	CAPACITOR, 1 μ F	1	*1			
62	ECEA1HU010	ECEA1HU010	CAPACITOR, 1 μ F	1	*1			
63	ECEA1HU010	ECEA1HU010	CAPACITOR, 1 μ F	1	*1			
64	PQCUV1H223KB	ECUV1H223KBV	CAPACITOR, 0.022 μ F	1		1	Y	P
66	ECEA1AU101	ECEA1AU101	CAPACITOR, 100 μ F	1	*1			
67	PQCUV1H223KB	ECUV1H223KBV	CAPACITOR, 0.022 μ F	1		1	Y	P
68	PQCUV1H223KB	ECUV1H223KBV	CAPACITOR, 0.022 μ F	1		1	Y	P
70	PQCUV1H223KB	ECUV1H223KBV	CAPACITOR, 0.022 μ F	1		1	Y	P
71	PQCUV1H223KB	ECUV1H223KBV	CAPACITOR, 0.022 μ F	1		1	Y	P
72	PQCUV1H223KB	ECUV1H223KBV	CAPACITOR, 0.022 μ F	1		1	Y	P
80	PQCUV1H200JC	ECUV1H200JCV	CAPACITOR, 20pF	1		1	Y	P
81	PQCUV1H223KB	ECUV1H223KBV	CAPACITOR, 0.022 μ F	1		1	Y	P
82	PQCUV1H223KB	ECUV1H223KBV	CAPACITOR, 0.022 μ F	1		1	Y	P
83	PQCUV1H223KB	ECUV1H223KBV	CAPACITOR, 0.022 μ F	1		1	Y	P
84	PQCUV1H223KB	ECUV1H223KBV	CAPACITOR, 0.022 μ F	1		1	Y	P
85	PQCUV1H223KB	ECUV1H223KBV	CAPACITOR, 0.022 μ F	1		1	Y	P
86	PQCUV1E104MD	ECUV1C104KBV	CAPACITOR, 1 μ F	1		1	Y	P
87	ECEA1VU330	ECEA1VU330	CAPACITOR, 33 μ F	1	*1			
88	ECEA1HN2R2S	ECEA1HN2R2S	CAPACITOR, 2.2 μ F	1	*1			
89	PQCUV1E104MD	ECUV1C104KBV	CAPACITOR, 0.1 μ F	1		1	Y	P
90	ECEA1VU330	ECEA1VU330	CAPACITOR, 33 μ F	1	*1			
91	ECEA1HN2R2S	ECEA1HN2R2S	CAPACITOR, 2.2 μ F	1	*1			
92	PQCUV1H101JC	ECUV1H101JCV	CAPACITOR, 100pF	1		1	Y	P
93	PQCUV1H101JC	ECUV1H101JCV	CAPACITOR, 100pF	1		1	Y	P
94	PQCUV1H470JC	ECUV1H470JCV	CAPACITOR, 47pF	1		1	Y	P
95	PQCUV1H470JC	ECUV1H470JCV	CAPACITOR, 47pF	1		1	Y	P
96	PQCUV1H470JC	ECUV1H470JCV	CAPACITOR, 47pF	1		1	Y	P

97	PQCUV1H223KB	ECUV1H223KBV	CAPACITOR, 0.022 μ F	1		1	Y		P
98	PQCUV1H223KB	ECUV1H223KBV	CAPACITOR, 0.022 μ F	1		1	Y		P
99	PQCUV1H223KB	ECUV1H223KBV	CAPACITOR, 0.022 μ F	1		1	Y		P
100, C101	PQCUV1H220JC	ECUV1H220JCV	CAPACITOR, 22pF	2		1	Y		P
102	PQCUV1H223KB	ECUV1H223KBV	CAPACITOR, 0.022 μ F	1		1	Y		P
601	ECEA1EU4R7	ECEA1EU4R7	CAPACITOR, 4.7 μ F	1	*1				
602	ECEA1EU4R7	ECEA1EU4R7	CAPACITOR, 4.7 μ F	1	*1				
603	PQCUV1H223KB	ECUV1H223KBV	CAPACITOR, 0.022 μ F	1		1	Y		P
604	PQCUV1H104ZF	ECUV1C104KBV	CAPACITOR, 0.1 μ F	1		1	Y		P
705	-----	ECUV1H223KBV	CAPACITOR, 0.022 μ F	1		5			P
I	ETA14Y180AY	ETA14Y180AY	TRANSFORMER	1	*1				
2~L5	PQLT2D6A	PQLT2D6A	TRANSFORMER	4	*1				
7~L14	PQLE106	PQLE106	COIL		*1	8			
21~L23	PQVFU50MT	PQVFU50MT	CERAMIC FILTER	3	*1				
24~L27	PQVFU50MT	PQVFU50MT	CERAMIC FILTER	4	*1				
30	PQLE106	PQLE106	COIL	1	*1				
JAC1, JAC2	PQJJ1G1Z	PQJJ1G1Z	JACK, PAGING	2	*1				
JAC3, JAC4	PQJJ1D3Z	PQJJ1D3Z	JACK, EP, EXT. HOLD	2	*1				
N1	PSJS64R55Z	PSJS64R55Z	CONNECTOR, 64P	1	*1				
N4	PQJP2D70Z	PQJP2D70Z	CONNECTOR, 2P	1	*1				
N5~CN8	PSJS20A25Z	PSJS20A25Z	CONNECTOR, 20P	4	*1				
N12	PQJP6D70Z	PQJP6D70Z	CONNECTOR, 6P	1	*1				
N13	PQJS6H30Z	PQJS6H30Z	CONNECTOR, 6P	1	*1				
N14	PQJS4H30Z	PQJS4H30Z	CONNECTOR, 4P	1	*1				
AT	CR23541GUF	CR23541GUF	LITHIUM BATTERY	1	*1				
W1	EVQ21409K	EVQ21409K	SWITCH	1	*1				
W2	PQSS2A24Z	PQSS2A24Z	SWITCH	1	*1				
W3	ESD11V120	ESD11V120	SWITCH	1	*1				
1	PQVCJ12000NB	PQVCJ12000N8	CRYSTAL OSCILLATOR	7					
2	PQVCL3276N6Z	PQVCL3276N6Z	CRYSTAL OSCILLATOR	1	*1				
3	PQVCJ8192N8Z	PQVCJ8192N8Z	CRYSTAL OSCILLATOR	1	*1				
I, Z2, I~Z6	PQRSLD8X103J	PQRSLD8X103J	RESISTOR ARRAY	5	*1				

2. PRINTED CIRCUIT BOARD (CPU BOARD)

2.1. Change from Supplement-2 page 3.



Bottom View

2.2. Change from Supplement-2 page 4.



Component View

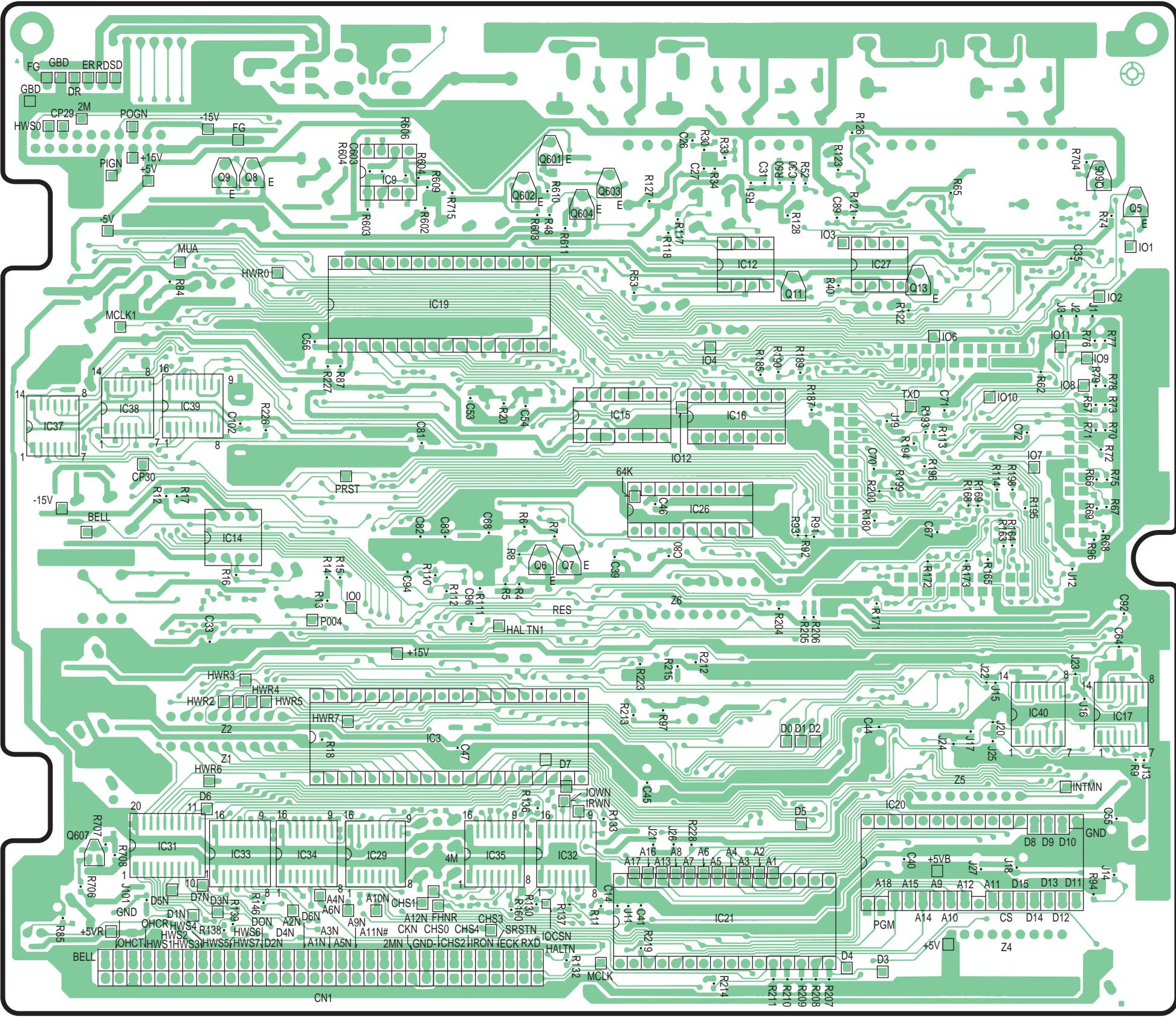
3. SCHEMATIC DIAGRAM (CPU CIRCUIT)

3.1. Change from Original Service Manual page 73~75.

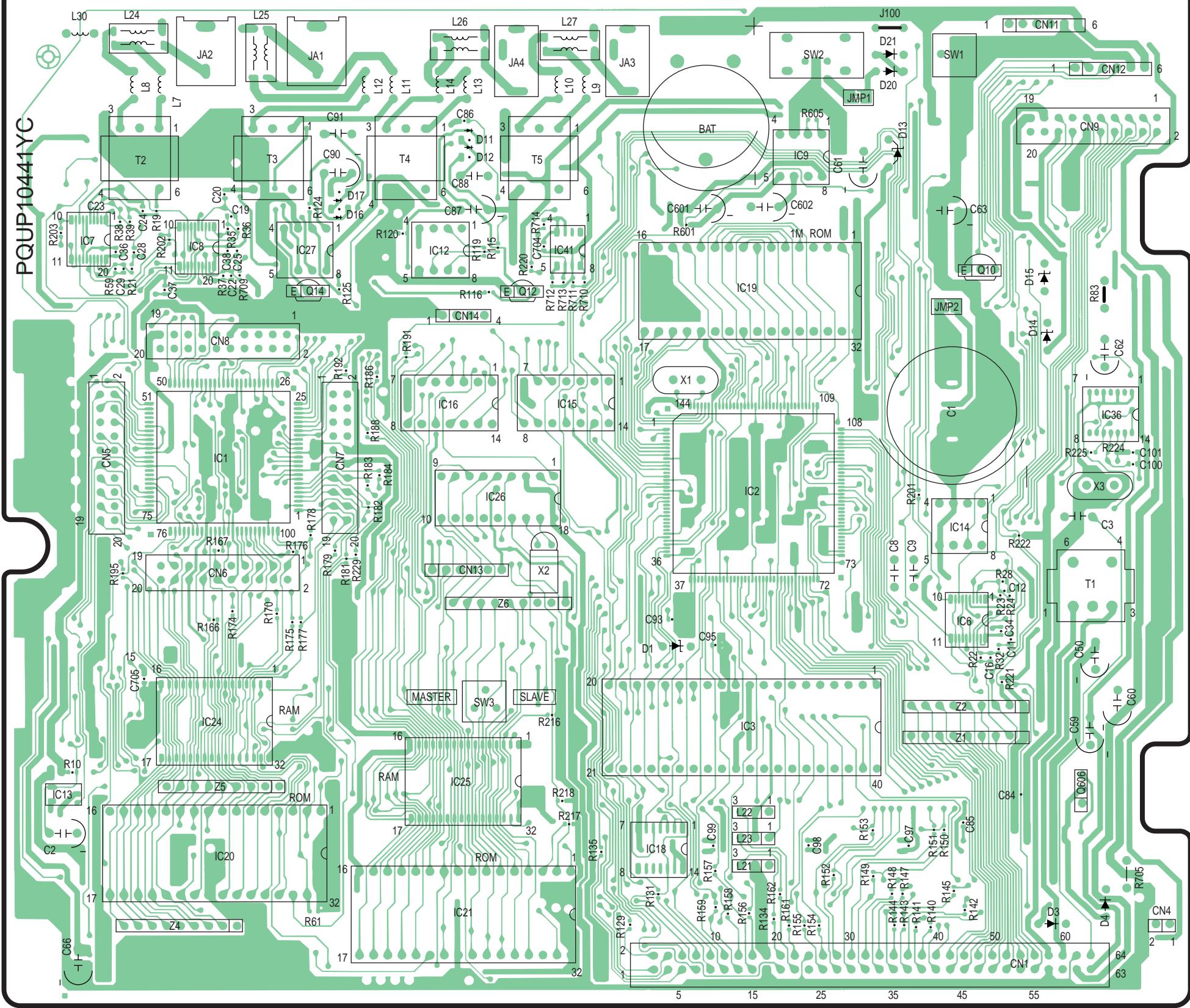


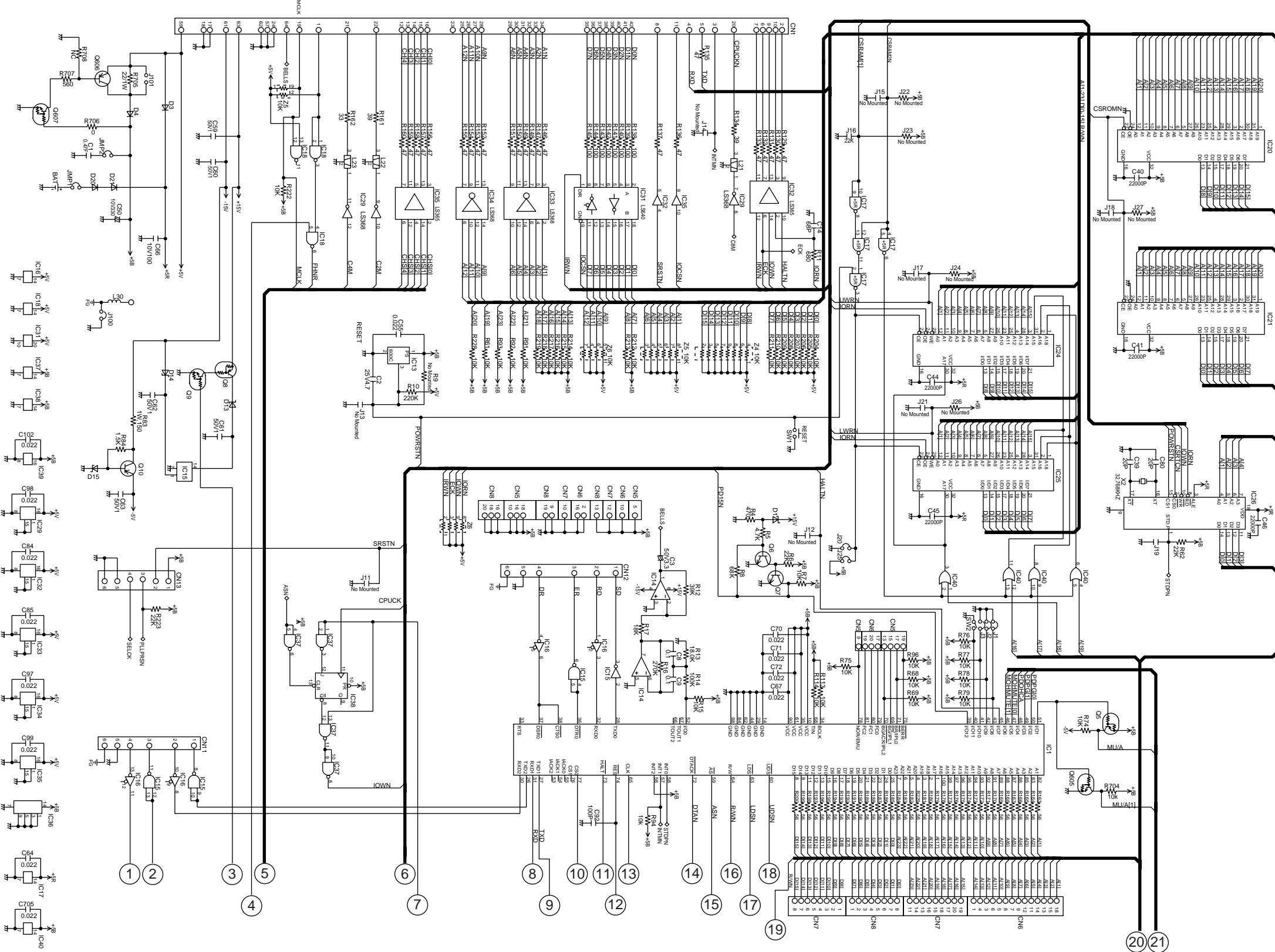
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KXTD1232AL

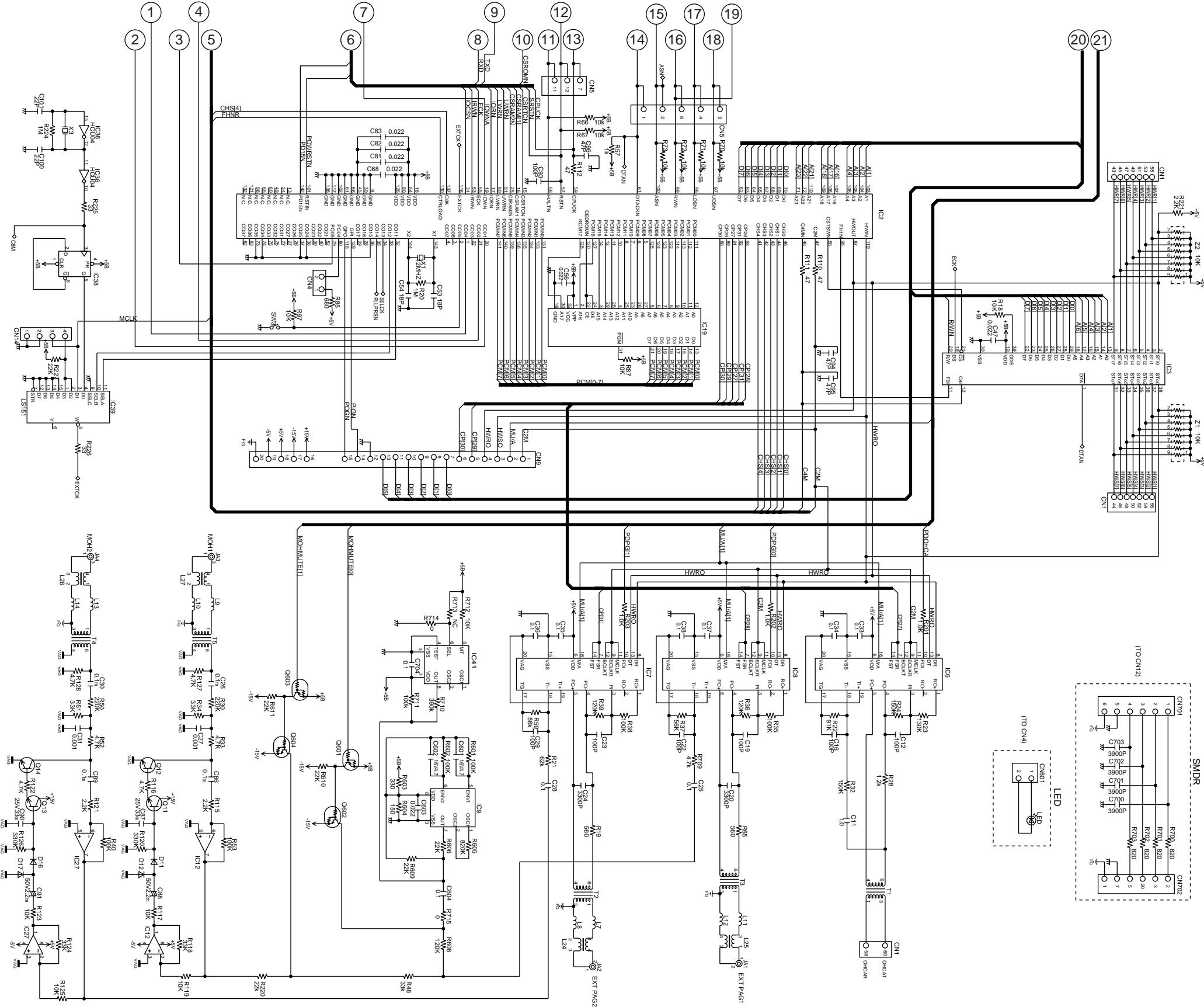
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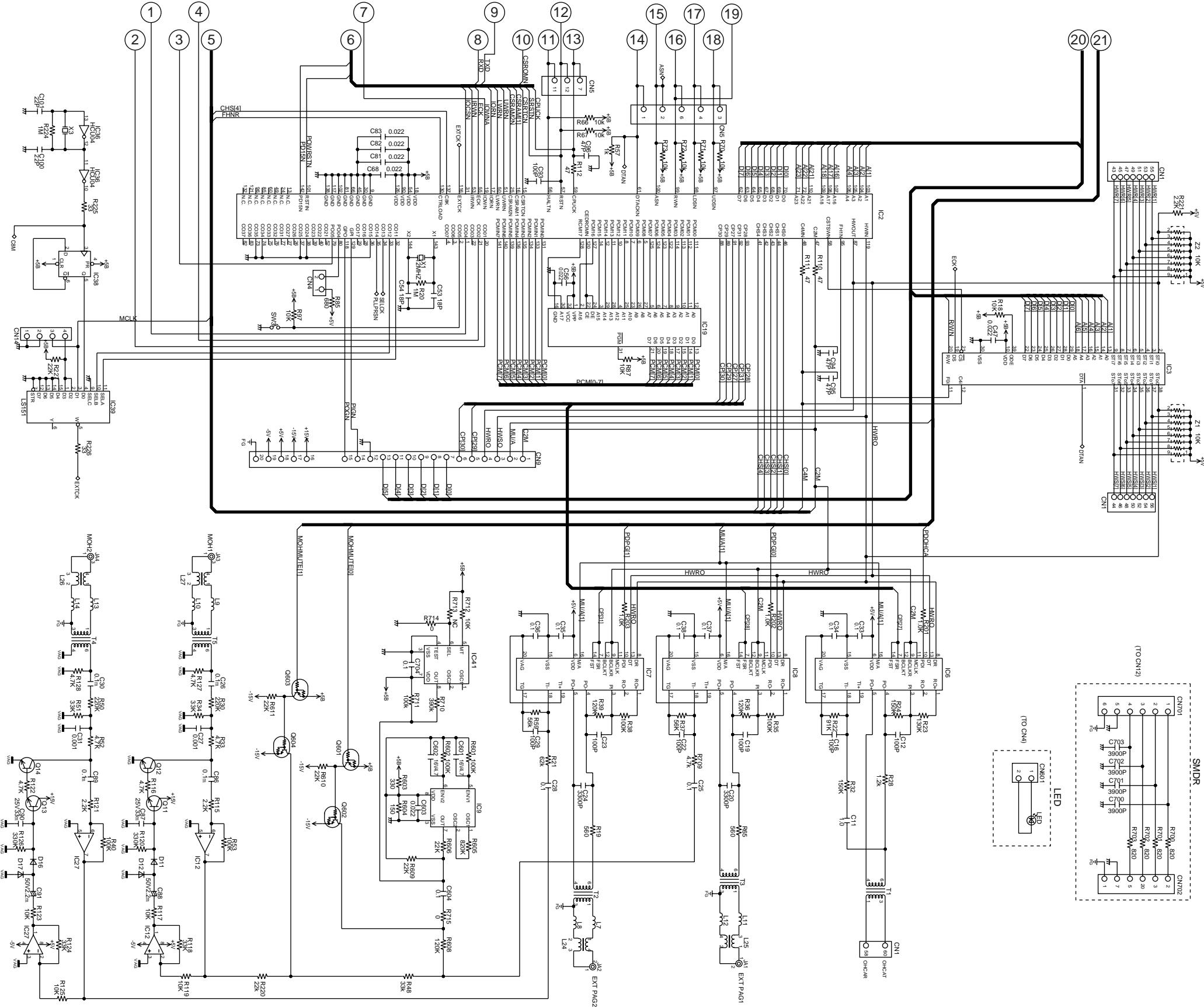


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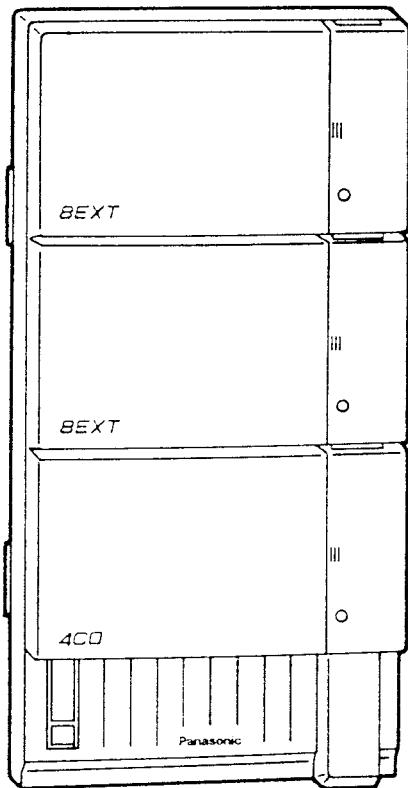




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Service Manual

and Technical Guide
DIGITAL SUPER HYBRID SYSTEM
KX-TD1232C



Panasonic

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FOR SERVICE TECHNICIANS

ICs and LSIs are vulnerable to static electricity.

When repairing, the following precautions will help prevent recurring malfunctions.

- Cover plastic parts boxes with aluminum foil.
- Ground soldering irons.
- Use a conductive mat on worktable.
- Do not grasp IC or LSI pins with bare fingers.

SAFETY PRECAUTIONS

1. Before servicing, unplug the power cord to prevent an electric shock.
2. When replacing parts, use only manufacturer's recommended components of safety.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to make the following insulation resistance test to prevent the customer from being exposed to a shock hazard.

INSULATION RESISTANCE TEST

1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screwheads, antenna, control shafts, handle brackets, etc. Equipment with antenna terminals should read between $3\text{ M}\Omega$ and $5.2\text{ M}\Omega$ to all exposed parts*. (Fig. 1) Equipment without antenna terminals should read approximately infinity to all exposed parts. (Fig. 2)
- *Note: Some exposed parts may be isolated from the chassis by design. These will read infinity.
4. If the measurement is outside the specified limits, there is a possibility of a shock hazard.
The equipment should be repaired and rechecked before it is returned to the customer.

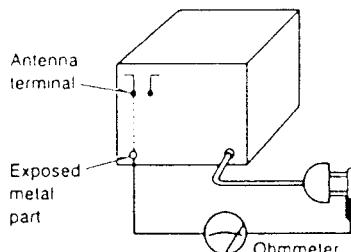


Fig. 1
Resistance = $3\text{ M}\Omega$ - $5.2\text{ M}\Omega$

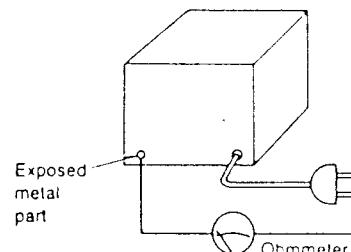


Fig. 2
Resistance = Approx ∞

NOTE

For details of installation, refer to the Installation Manual.

SPECIFICATIONS

General Description

This specifications is for CANADA version only. Refer to this simplified manual (cover) for other areas.		
1. Capacity	CO lines	12 max.
	Stations	32 max. (64 max. with XDP)
2. Control Method	Stored Program CPU: 16 bits CPU	Control ROM: 512 KB, Control RAM: 128 KB
3. Switching	Non Blocking PCM Time Sharing Switch	
4. Power Supplies	Primary	120 V AC, 60 Hz
	Secondary	Station Supply Volt: 30 V, Circuit Volt: ±5 V, ±15 V
	Power Failure	
	● 6 CO lines max. assigned to stations (Power Failure Transfer)	
	● System operation for several hours by batteries (car batteries consisting of two 12 V DC) recommended	
5. Dialing	Outward	Dial Pulse 10PPS, 20PPS
	Internal	Tone (DTMF) Dialing
	Mode Conversion	Dial Pulse (DP) 10PPS, 20PPS
6. Intercom paths	4	Tone (DTMF) Dialing
7. Connector	CO lines	DP-DTMF, DTMF-DP
	Station	Modular Jack (CA14A for KX-TD1232C)
	Paging Output	Amphenol Connector
	External Music Input	Pin Jack (RCA JACK)
8. EXT Connection	Cable	Two-conductors Jack (MINI JACK 3.5 mm/9/64 inch diameter)
9. SMDR	Interface	1 pair wire (T, R) (Standard Telephones, KX-T7052)
Station Message	Output Equipment	2 pair wire (D1, D2 or T, R, D1, D2) (KX-T7220, KX-T7230, KX-T7235, KX-T7250, KX-T7240, KX-T7040)
Detail Recording	Detail Recording	2 pair wire (T, R, D1, D2) (KX-T7020, KX-T7030, KX-T7050, KX-T7055)
10. Dimensions	320 (W)×640 (H)×110 (D) mm	3 pair wire (T, R, D1, D2, P1, P2) (KX-T7130)
11. Weight	7.8 kg	EIA (RS-232C)
		Printer
		Date, Time, Ext. Number, CO Line Number, Dialed Number, Call Duration, Account Code

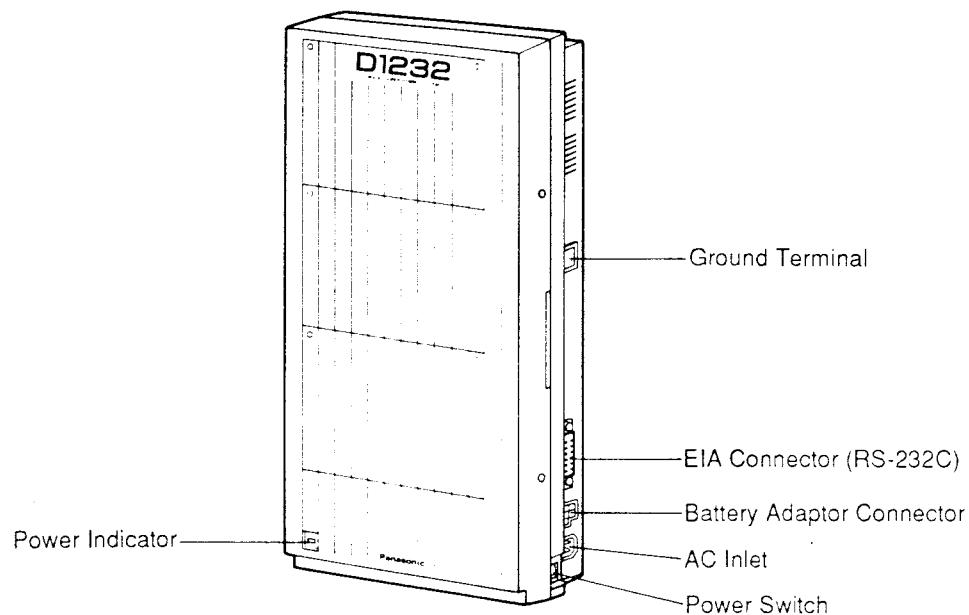
Characteristics

1. Station Loop Limit	KX-T7220/KX-T7230/KX-T7235/ KX-T7250/KX-T7020/KX-T7030/ KX-T7050/KX-T7055/KX-T7130 Standard Telephone, KX-T7052 Doorphone	40 ohms 600 ohms including set 20 ohms
2. Minimum Leak Resistance	15,000 ohms	
3. Maximum Number of Station Instruments per Line	1 (KX-T7220, KX-7230, KX-T7235, KX-T7250, KX-T7130, KX-T7020, KX-T7030, KX-T7050, KX-T7055, KX-T7052 or standard telephone) 2 (Parallel or Extra Device Port Connection of a proprietary telephone and a standard telephone)	
4. Ring Voltage	70 Vrms at 25 Hz depends on Ringing Load	
5. Primary Power	120 V AC, 60 Hz, 2 A maximum	
6. Central Office Loop Limit	1600 ohms maximum	
7. Environmental Requirements	0–40°C, 132–104°F, 10%–90%	
8. Hookswitch Hatch Timing Range	204–1000 milliseconds	

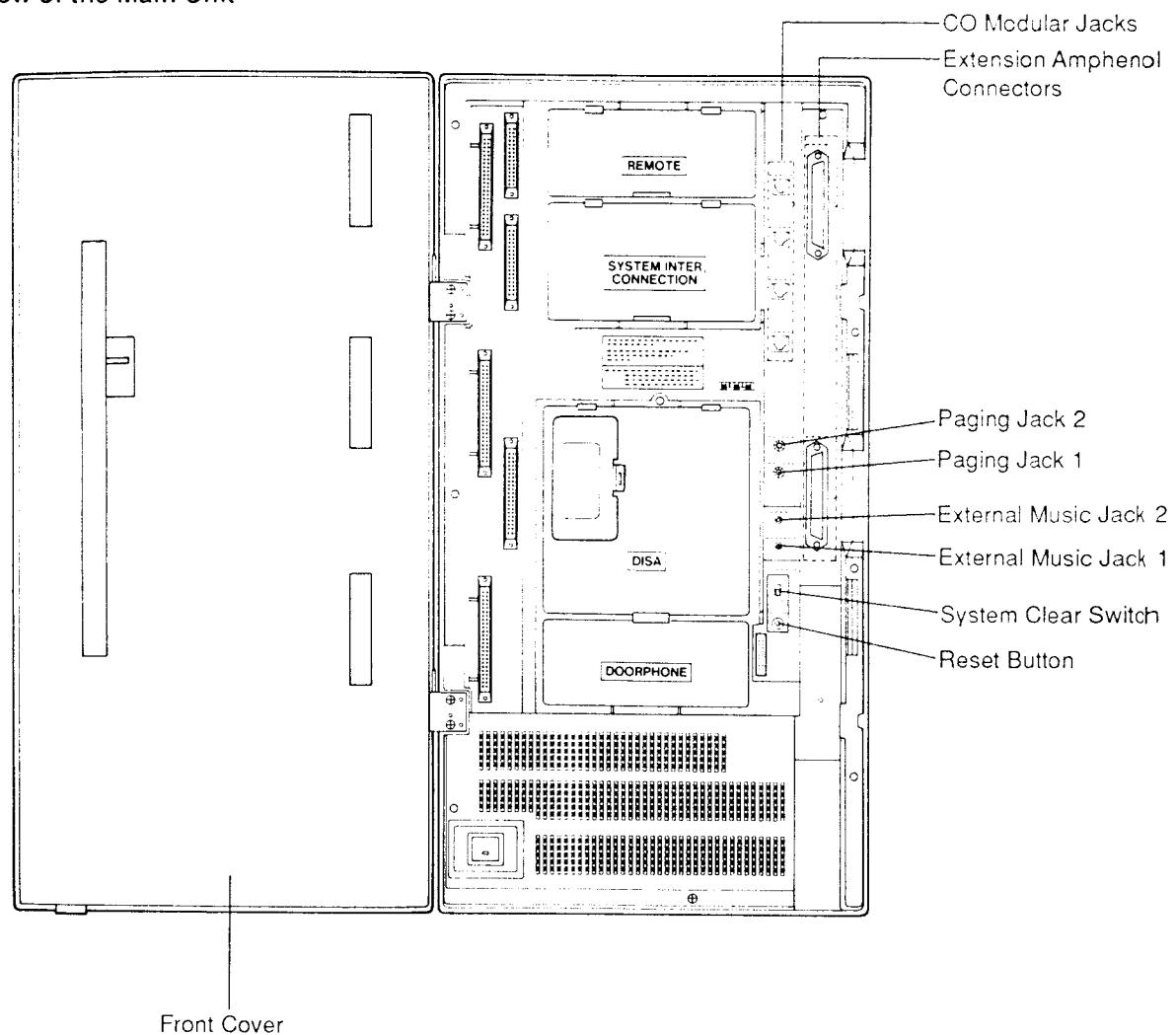
Design and specifications are subject to change without notice.

NAME AND LOCATION

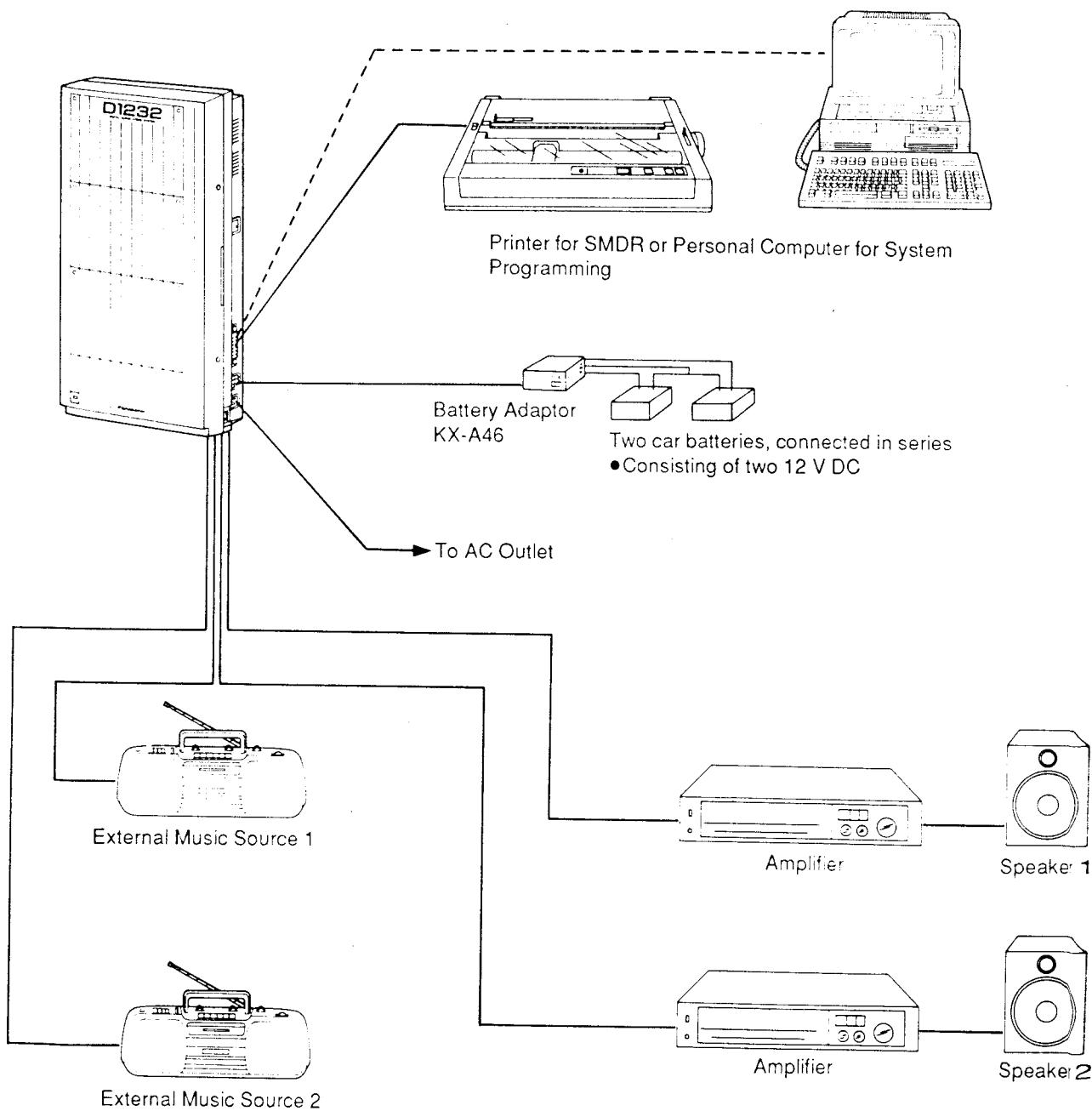
Overview of the Main Unit

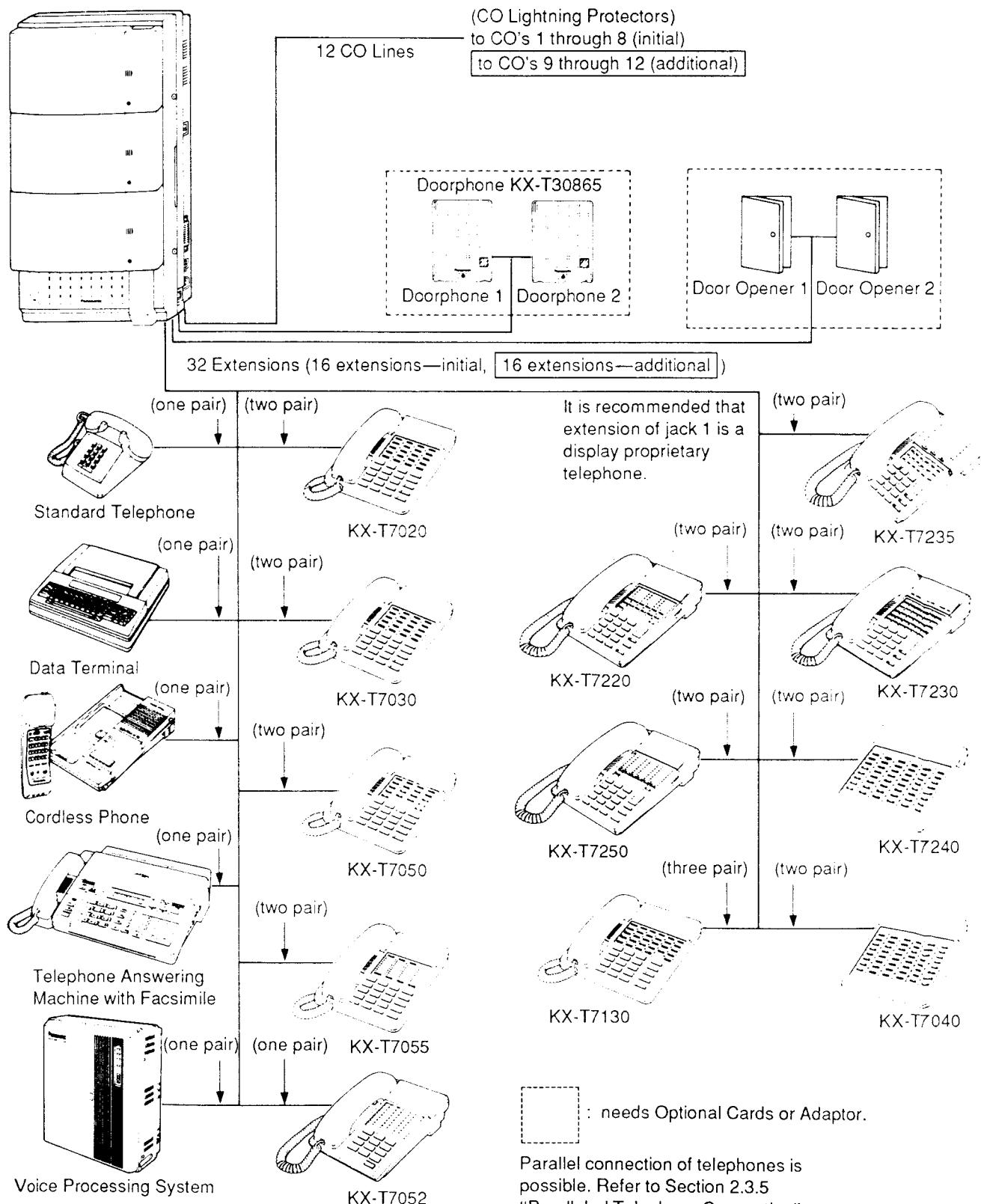


Inside View of the Main Unit



CONNECTION

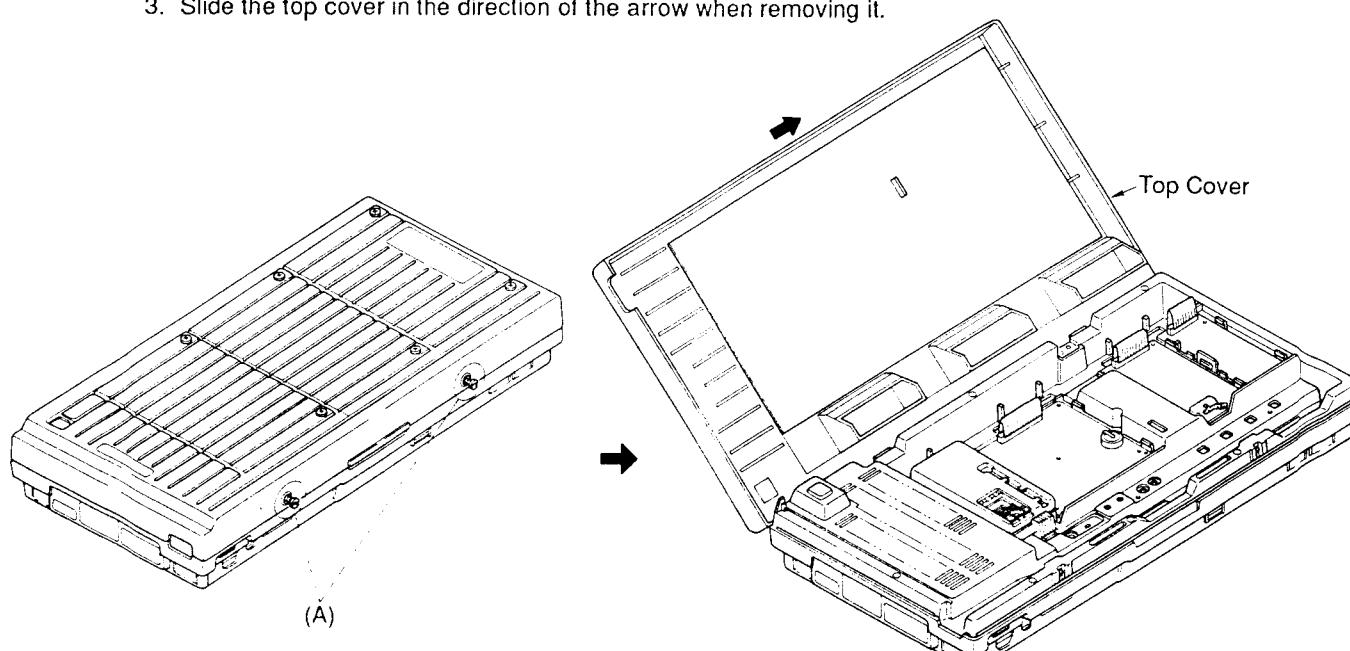
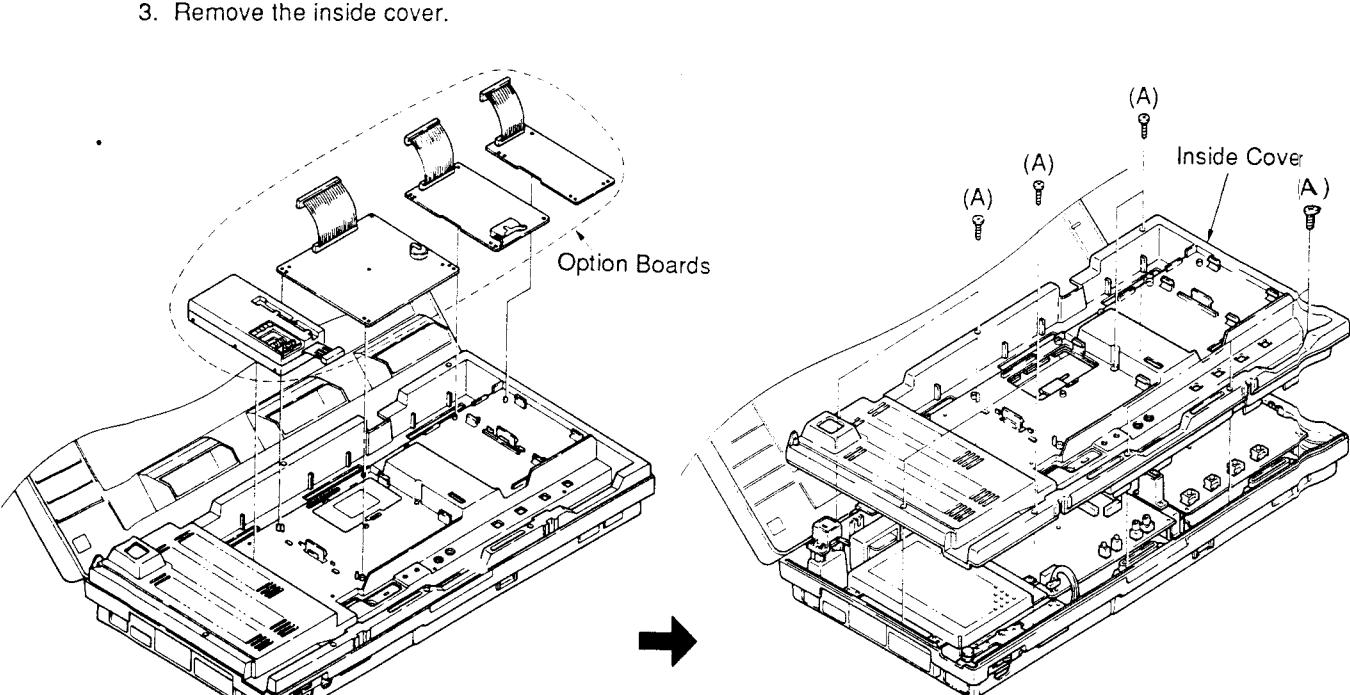


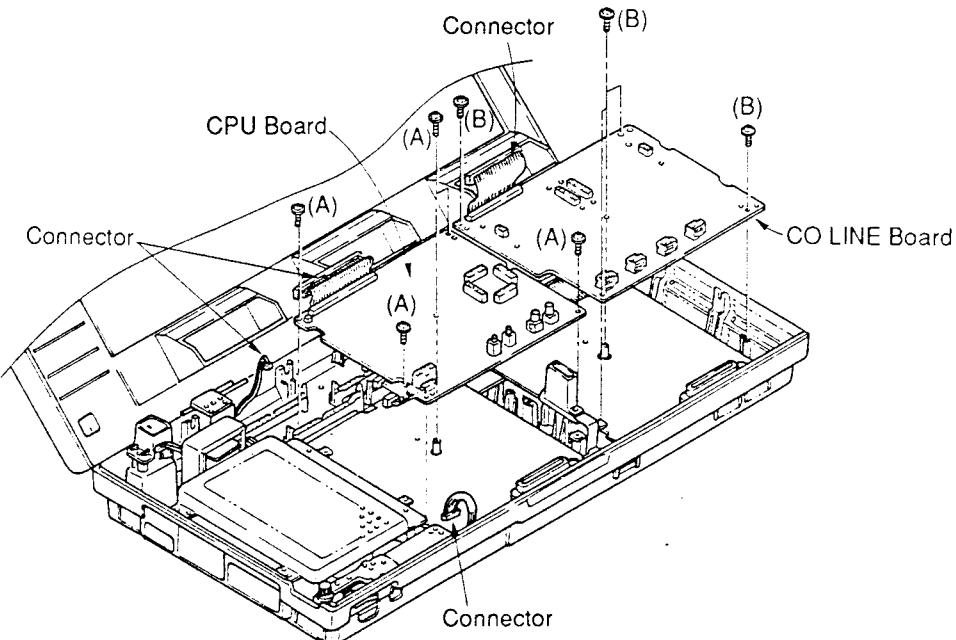
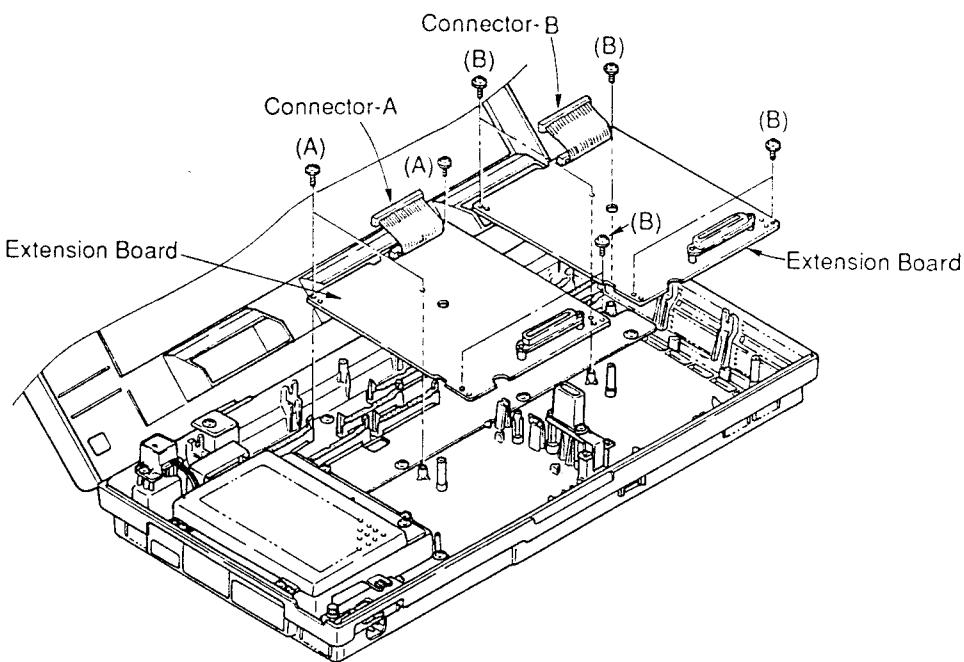


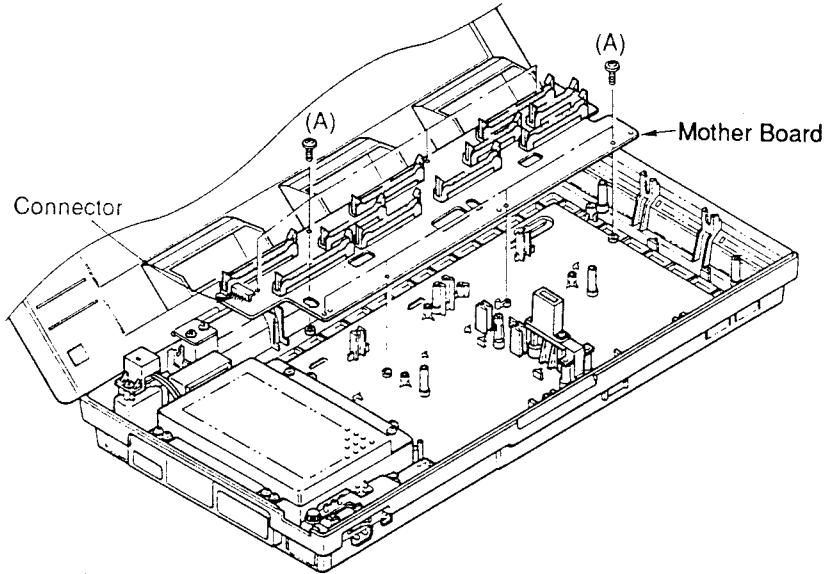
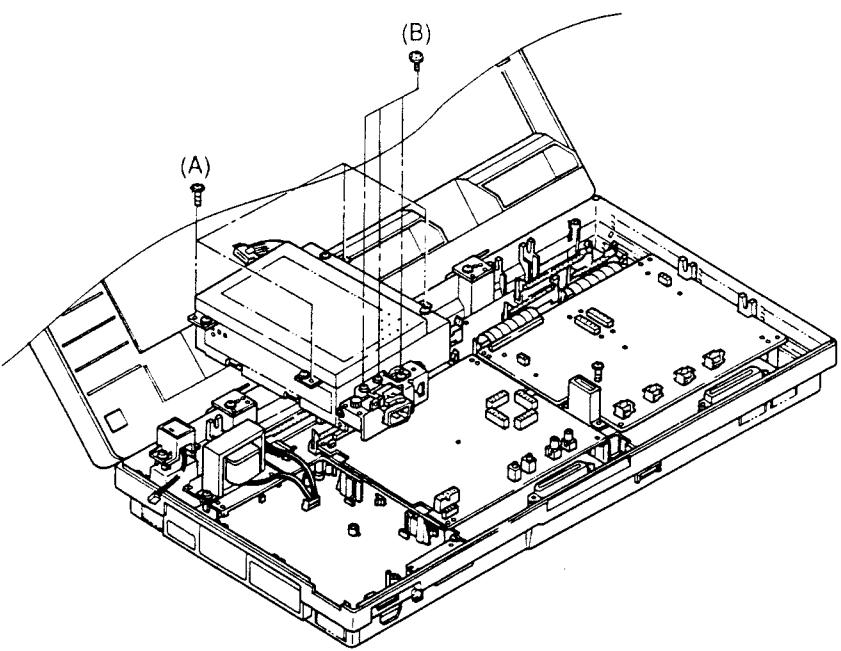
[] : needs Optional Cards or Adaptor.

Parallel connection of telephones is possible. Refer to Section 2.3.5 "Paralleled Telephone Connection".

DISASSEMBLY INSTRUCTIONS

Ref. No. 1	HOW TO REMOVE THE TOP COVER
Procedure 1	<p>1. Loosen the two screws (A).</p> <p>2. Open the top cover.</p> <p>3. Slide the top cover in the direction of the arrow when removing it.</p> 
Ref. No. 2	HOW TO REMOVE THE INSIDE COVER
Procedure 1 → 2	<p>1. Remove the option boards.</p> <p>2. Remove the nine screws (A).</p> <p>3. Remove the inside cover.</p> 

Ref. No. 3	HOW TO REMOVE THE CPU AND CO LINE BOARDS	
Procedure 1 → 2 → 3	(CPU Board)	(CO LINE Board)
	1. Remove the five screws (A). 2. Remove the three connectors. 3. Remove the CPU Board.	1. Remove the five screws (B). 2. Remove the one connector. 3. Remove the CO Line Board.
		
Ref. No. 4	HOW TO REMOVE THE EXTENSION BOARD	
Procedure 1 → 2 → 3 → 4	1. Remove the five screws (A) or (B). 2. Remove the one connector (A) or (B). 3. Remove the Extension Board.	
		

Ref. No. 5	HOW TO REMOVE THE MOTHER BOARD
Procedure	
1 → 2 → 3 → 4 → 5	<ol style="list-style-type: none"> 1. Remove the seven screws (A). 2. Remove the one connector. 3. Remove the mother board.
	
Ref. No. 6	HOW TO REMOVE THE POWER SUPPLY UNIT
Procedure	
1 → 2 → 6	<ol style="list-style-type: none"> 1. Remove the four screws (A). 2. Remove the three screws (B). 3. Remove the two connectors. 4. Remove the Power Supply Unit.
	

Ref. No. 7	HOW TO REMOVE THE POWER SUPPLY BOARD
Procedure 1 → 2 → 6 → 7	<ol style="list-style-type: none">1. Remove the four screws (A).2. Remove the shield cover.3. Remove the four screws (B).4. Remove the Power Supply Board.

The diagram illustrates the three steps required to remove the Power Supply Board. Step 1 shows the shield cover being removed, with two screws labeled (A) indicated. Step 2 shows the power supply board itself being removed from its housing, with four screws labeled (B) indicated. Step 3 shows the empty housing after the board has been removed.

CIRCUIT OPERATIONS

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7) CALLER ID CARD	50

1. GENERAL DESCRIPTION

1-1. OUTLINE

This equipment is a telephone exchange on the premise constructed with basic (KX-TD1232). Basic contains controlling section and time-sharing switch section.

The features of this system are as follows;

(1) Super hybrid system

By one sort of a board, this system covers the single line telephones (SLT), the analogue type of the proprietary integrated telephone system (APITS) and the digital type of the proprietary integrated telephone system (DPITS) at the extnsion (EXT) ports.

(2) Parallel station

A SLT and a APITS can be connected parallelly at each extension port. They can be used parallelly as a mother phone and a daughter one.

(3) Extra Device Port (XDP)

A SLT and a DPITS can be connected parallelly at each extension port. They can be used independently as individual phones.

(4) This system supports a new type of DPITS which is equipped a large LCD.

(5) Self-diagnostic function

It can find out the hardware trouble in the controllers and the circuit lines.

(6) Connection between another system

This system can be connected with another system by using an optional SIC CARD. They can be operated as a 2464 system.

1-2. OUTLINE OF SPECIFICATIONS

ITEMS	SPECIFICATIONS
Control system	Stored program system
Call system	Non blocking PCM TSS system
Exchange system	T1 (Time switch only)
Redundancy structure	Non multiplex, simplex
Modulation system	μ Law/A Law (both), PCM 8 bits 8 kHz sampling
CPU	CPU 68301 (8.192 MHz) No sub-processor on CO/EXT CARDS
Max. number of CO lines	12 lines (8 lines as standard)
Max. number of EXT lines	32 lines (16 lines as standard) XDP function allows to connect 64 terminals.
Max. number of connectable DSS console	4 units connect at EXT ports
Max. number of connectable Door-phone	2 units use optional card
Max. number of connectable system	2 units, 30 call channels use optional card
DISA simultaneous functional lines	2 lines use optional card
MODEM ports	1 port use optional card
Conference lines	3 personsx6 conferences
External paging ports	2 ports
External holding sound sources ports	2 ports
Internal holding sound sources	1, no available for USA and Canada
RS-232C ports	1 port, asynchronous 300~9600 bps (full duplex)
Door-opener control outputs	2 channels, attached with a Door-phone card, optional
OHCA lines	1 path

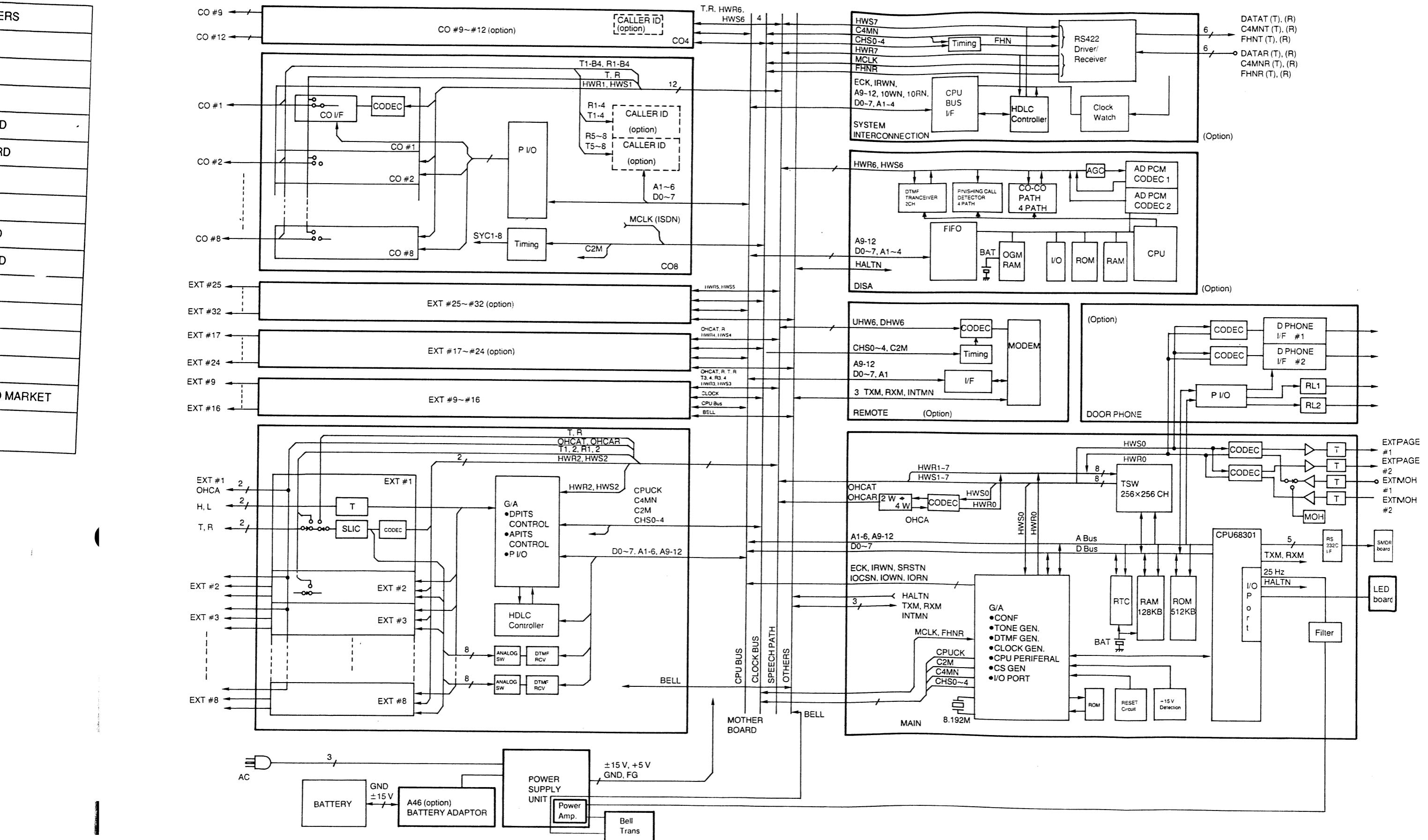
1-3. ARTICLES

Unit structure and function are outlined in this section.

CLASS	UNIT NAME	PRODUCT CODE	QTY	OTHERS
BASIC	POWER SUPPLY UNIT	KX-TD1232	1	
	MOTHER CARD	KX-TD1232	1	
	CPU CARD	KX-TD1232	1	CPU, TSW, CONF
	CO CARD (BASIC)	KX-TD1232	1	8 CO LINES/BOARD
	EXT CARD (BASIC)	KX-TD1232	2	8 EXT LINES/BOARD
	LED BOARD	KX-TD1232	1	
	SMDR BOARD	KX-TD1232	1	
OPTION	EXPANSION CO CARD	KX-TD180	1	4 CO LINES/BOARD
	EXPANSION EXT CARD	KX-TD170	2 Max.	8 EXT LINES/BOARD
	DOOR-PHONE CARD	KX-TD160	1	
	SIC CARD	KX-TD192	1	EXP I/F
	REMOTE CARD	KX-TD196	1	
	DISA CARD	KX-TD191	1	
	CALLER ID CARD	KX-TD193	3 Max.	ONLY FOR USA/CND MARKET
	BATTERY BACK-UP ADAPTER	KX-A46	1	

1-4. BLOCK DIAGRAM

1) GENERAL BLOCK DIAGRAM



KX-TD1232C

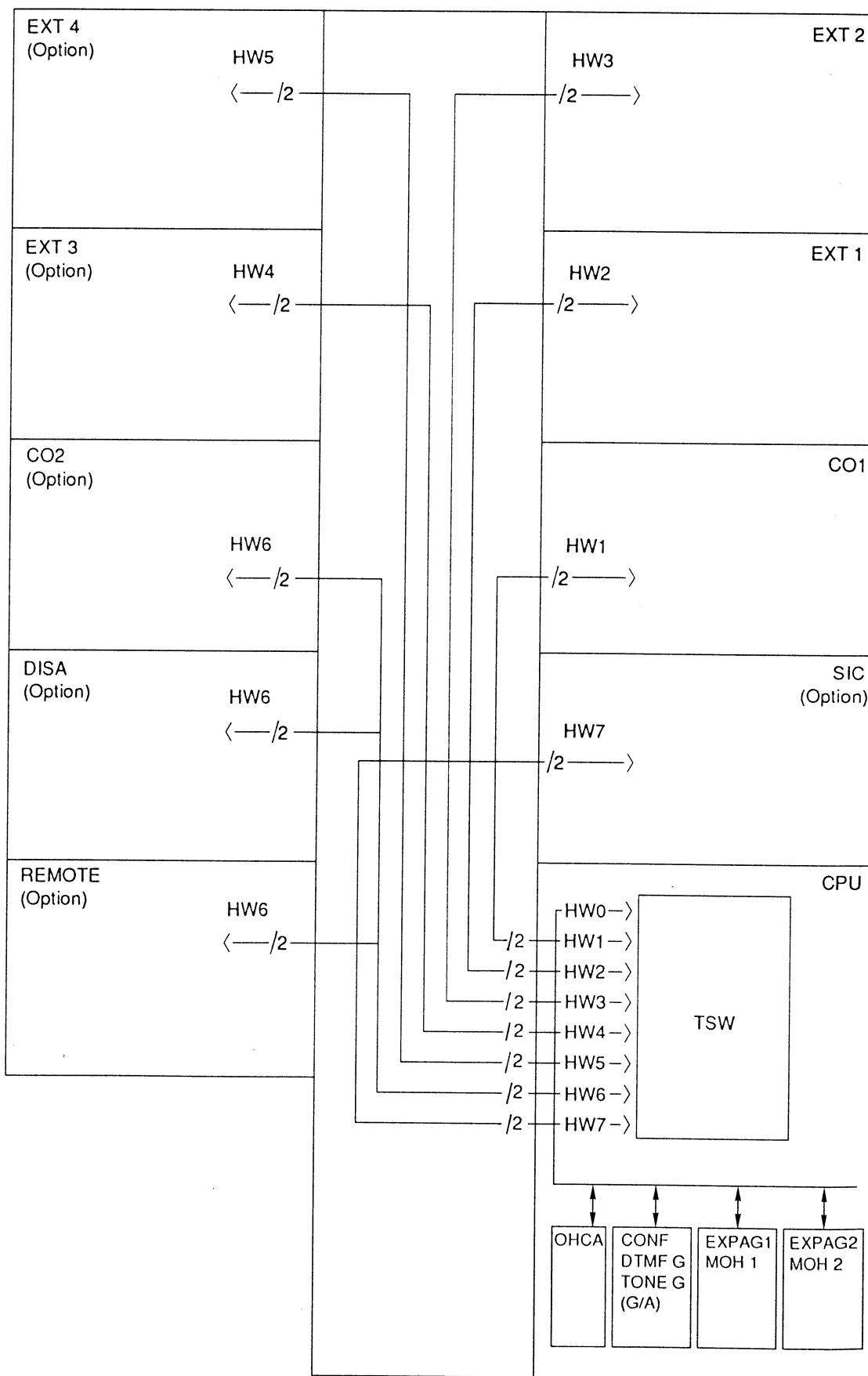
KX-TD1232C

MEMO

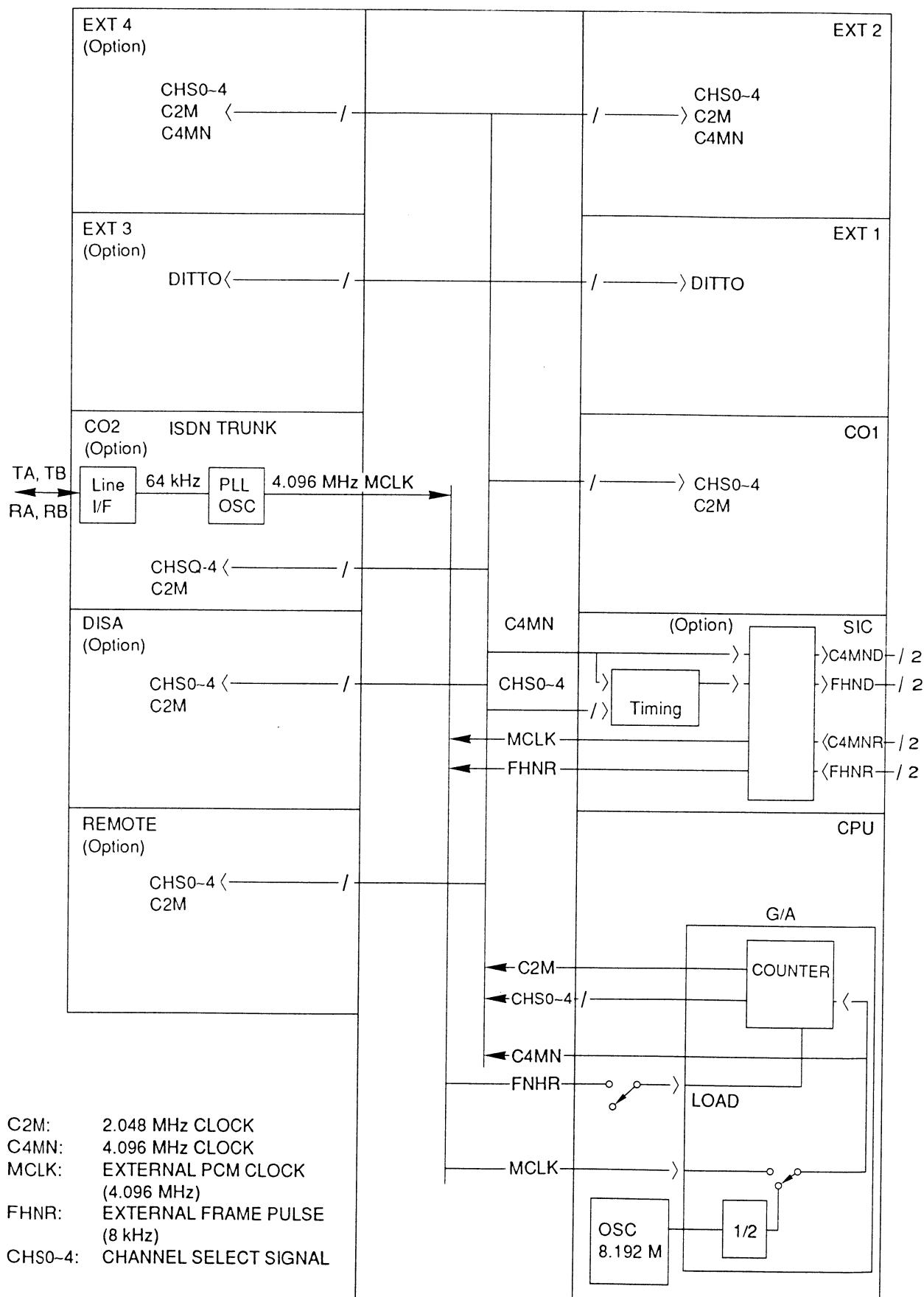
MEMO

SYSTEM D

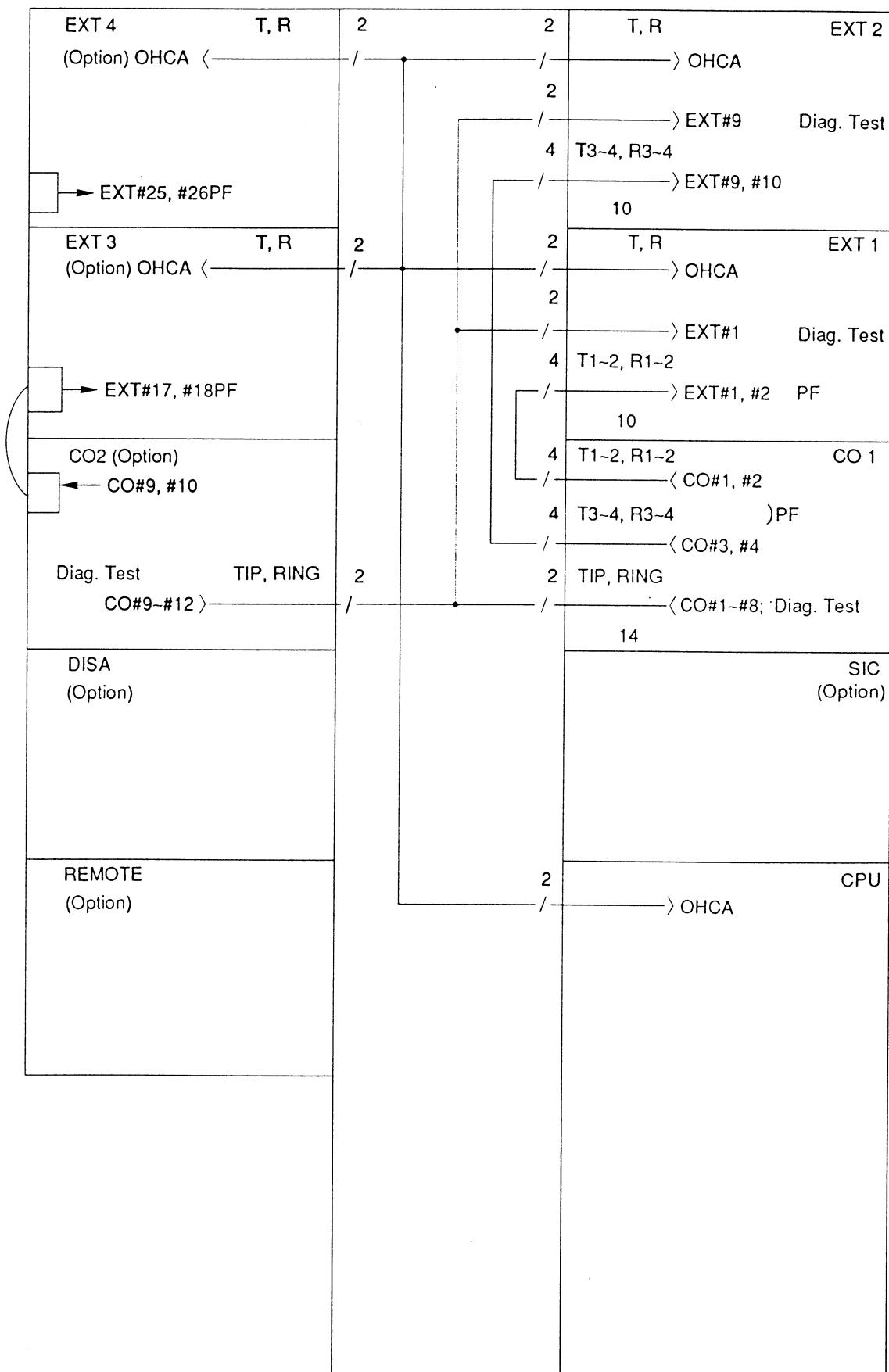
2) SYSTEM DIAGRAM OF PCM HIGHWAY



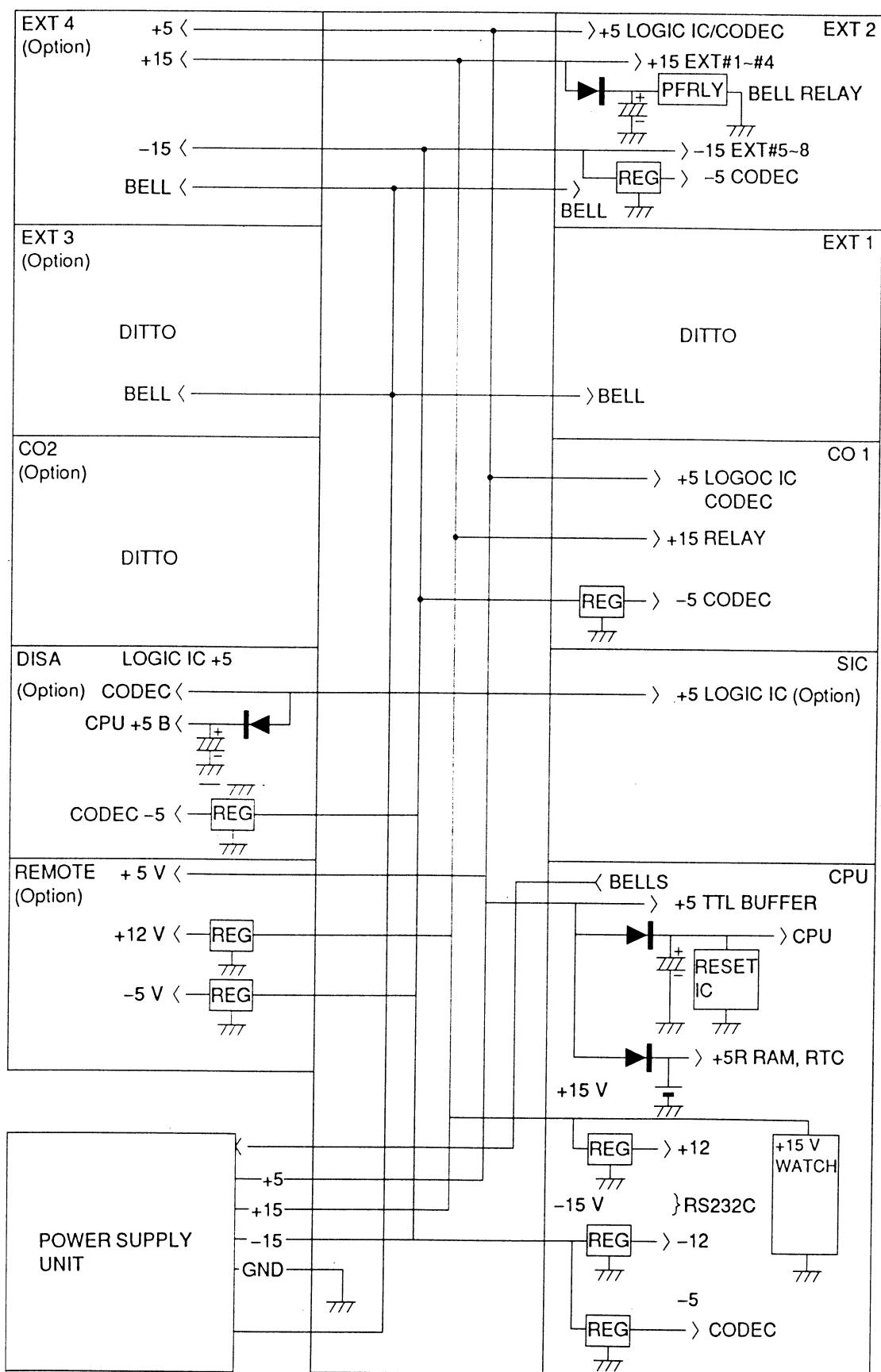
3) SYSTEM DIAGRAM OF PCM-CLOCK



4) SYSTEM DIAGRAM OF ANALOGUE LINE



5) SYSTEM DIAGRAM OF POWER SUPPLY



1-5. CONTENTS

This equipment has mainly 3 types of cabinets and 2 types of optional cabinets.

Each cabinet relates with each board about installation as follows.

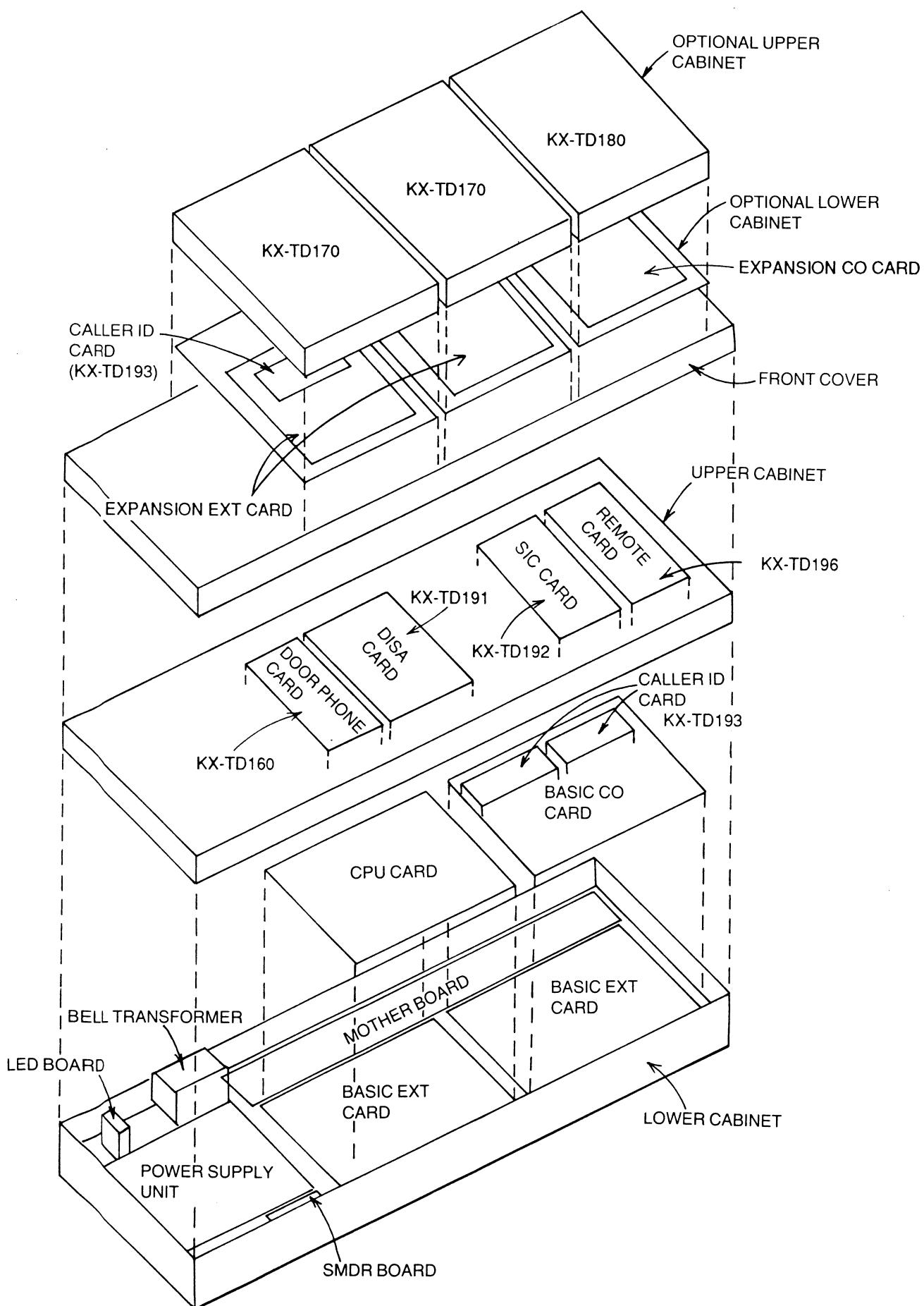
■ BASIC CABINET FRONT COVER

UPPER CABINET	REMOTE CARD SIC CARD DISA CARD DOOR-PHONE CARD	(Option) (Option) (Option) (Option)
LOWER CABINET	CPU CARD BASIC CO CARD BASIC EXT CARD POWER SUPPLY UNIT MOTHER BOARD LED BOARD SMDR BOARD	(Basic) (Basic) (Basic) (Basic) (Basic) (Basic) (Basic)
	CALLER ID CARD BATTERY BACKUP ADAPTER	(Option) (Option)

■ OPTIONAL CABINET

OPTIONAL UPPER CABINET

OPTIONAL LOWER CABINET	EXPANSION CO CARD EXPANSION EXT CARD CALLER ID CARD	(Option) (Option) (Option)
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2. FUNCTION OF EACH BOARD

2-1. BASIC

1) POWER SUPPLY UNIT

Power supply unit generates three DC voltage of +15, -15 and +5.3 V from AC power source, and supplies them to the system. To connect the option of BATTERY BACK-UP ADAPTER (KX-A46) allows the system to be connected with the back-up batteries as measure to the power failure.

Function	Description
Generating DC voltage	Generates +15, -15 and +5.3 V from AC power or the batteries. Capacities: +5.3 V, 3.0 A +15 V, 4.7 A -15 V, 4.5 A
Connecting batteries (by using KX-A46)	It recharges the batteries when AC power turns on. When AC power turns off, it is powered from the batteries, and if the voltage at the battery terminals are derated under the specified voltage, it cuts the batteries off to prevent the over discharge.
Bell Amp	It increases the bell signal from CPU CARD, and sends to the EXT CARD.

2) CPU CARD

CPU CARD covers the CPU function which controls the system and TSW (time sw.) function which exchanges the PCM lines as the main functions. In addition, it is equipped with the common resources such as the conference function, the clock function, and the clock generator function.

Function	Description
CPU function	Controls the general system according to the programs.
TSW function	Exchanges the PCM lines following the control from CPU.
Conference function	Allows the conference call of 3-personx6-conference.
Clock function	The clock LSI backed up by batteries realizes the clock function in the system.
Tone generator	Generates 4 types of the call progress tones and 2 channels of the DTMF tones.
Holding tone source	Internal holding tone source (optional for the derivative models) External holding tone source: 2 channels
External paging function	Out-put function for 2 channels of the external pagings
Serial I/F function	RS232C port: 1 port I/F for communication with MODEM IC on the REMOTE CARD: 1 port
Clock generator function	Generates the clock for PCM highway system and supplies to the system.
Voltage watching	Watches the voltages of +5 V and +15 V, resets the system if +5 V is derated.
Back-up function	Back up the CPU peripherals (+53 V) for 1 second or more during the power failing. Back up the system data in RAM and the clock IC for 7 years by the lithium battery.
OHCA function	Circuit for converting 2-4 w. signals. CODEC realizing OHCA (Off hook call announcement) function.
Bell signal generator function	25 Hz signals are generated by the CPU and the filter circuit.

3) BASIC CO CARD

BASIC CO CARD functions the interface between the system and the lines. 8 lines per one CO card are covered.

Function	Description
Ring detection function	Detecting the bell signals from the stations.
Catch of CO lines function	Catching the CO lines by making the DC current loop.
End of call function	CPC detection
Dial pulse transmission function	Out-put the dial pulse to the lines by switching the DC loop on and off.
2-4 wires convert	2 w. signals from the stations are converted in 4 w.
A/D, D/A convert	Converting between 4 w. analogue signals and PCM digital signals.
Transfer during power failure	Having 4 direct paths to the extensions for transferring when the power fails.
Diagnostic function	Interface in each line has the mode to connect with an extension line through a test path instead of a line.

4) BASIC EXT CARD

BASIC EXT CARDS are installed into the system as standards, and play a role of the interface between the system and the terminals. The terminals which are connectable with this board are SLT, APITS and DPITS (including the Voice mail). 8 lines per one card are covered and they allow a parallel connection of SLT and APITS (mother and daughter operation) as well as the parallel connection of SLT and DPITS (independent operation).

Terminal	Function	Description
SLT	Power supply	Supplying the power to SLT for calling.
	Hook detection	Detection of On-hook and Off-hook when the bell signal is not presented.
	Ring trip detection	Detection of Off-hook when the bell signal is presented.
	Dial pulse detection	Detection of pulse dial
	DTMF tone detection	Detection of DTMF tone
	Switching in power failure	Connecting directly between the CO line and the terminal when power fails. 2 lines
SLT APITS	2-4 w. convert	Converting 2 w. from the terminals into 4 w.
	A/D, D/A convert	Converting between 4 w.-analogue signals and PCM digital signals by CODEC.
APITS	Data transmission	Communication with the APITS about the control data such as key information, the ramp information.
	OHCA function	Having the paths connecting the APITS with the OHCA section in the main board
APITS DPITS	Current supply	Supplying the current necessary to operate the APITS and the DPITS through the data line.
DPITS	Data Transmission	Communicating with the DPITS about the voice (2 B) and the control data.
Common	Diagnostic function	Diagnosis of the CO card and the DTMF receiver. Diagnosis of the PCM highway by the loop back.

5) MOTHER BOARD

Each card of CPU, CO CARD, EXT CARD etc. is powered through the MOTHER BOARD, and also transmits the signals through it.

6) LED BOARD

LED BOARD is for installing LED which shows the operating status.

7) SMDR BOARD

SMDR BOARD leads signal of RS-232C out with DIN 25 pin connector.

2-2. RESOURCE OF OPTION**1) EXPANSION CO CARD (KX-TD180)**

EXPANSION CO CARD is an optional card for extending the CO lines from 8 up to 12 lines. The differences between this card and the basic one are as follows;

- The number of lines are 4. (8 for basic one)
- 2 lines for the transfer function when the power fails

2) EXPANSION EXT CARD (KX-TD170)

EXPANSION EXT CARD is an optional card for extending the EXT lines from 16 up to 24 or 32 lines. The differences between this board and the basic one are as follows;

- No diagnostic function for the CO card

3) DOOR-PHONE CARD (KX-TD160)

DOOR-PHONE CARD is an optional card for connecting the door-phone and the door-opener with the system. The system can be installed with one card, and one of this card can cover 2 units of the door-phone and 2 units of the door-opener.

Function	Description
Current supply	Supplying the current to the door-phone.
2-4 w. convert	Converting 2 w. signals from the door-phone into 4 w.
A/D, D/A convert	Converting between the 4 w. analogue signals and the PCM digital signals by CODEC.
Detect connection of Door-phone	Detect if this board is connected with the door-phone.
Door-opener control	2 channels of the relay contact out-put for the door-opener control.

4) REMOTE CARD (KX-TD196)

REMOTE CARD is an optional card for the maintenance through the telephone line such as the change, the up-load and down of the system data, the diagnostic of the system and etc.

Function	Description
A/D, D/A convert	Performing A/D and D/A between the PCM highway and MODEM by CODEC.
MODEM function	MODEM function at 300 and 1200 bps. Connected with the CPU through the serial interface.

5) DISA CARD (KX-TD191)

DISA CARD is an optional card that automatically responds to the incoming signals on the CO lines without through operator, and by receiving the secondary dial (DTMF signals) that calls the specific extension, connects with the MODEM and between the CO lines. The number of channels is 2.

Function	Description
Sending OGM	Sending OGM (Out Going Message) stored in RAM to the CO line. 2 types of OGM for 32 sec. each are stored.
DTMF signal detection	After sending OGM to CO line, detecting the in-coming signal of DTMF.
Call between CO lines	Two call paths for call between CO lines.
DTMF repeat	When calling between the CO lines, resending the received DTMF to maintain the certain level of the DTMF signals.
End of call detection	When calling between the CO lines, detecting the no tone, the cyclic tone and the continuous tone. 2 channels/1 path, total 4 channels.
OGM record	Recording the OGM from the specific extension into RAM. Controlling the level by AGC circuit. Only one channel is available as the recording channel.
FIFO communication	Communicating between CPU on this card and main CPU through FIFO memory.

6) SYSTEM INTERCONNECTION CARD (KX-TD192)

SYSTEM INTERCONNECTION CARD is an optional card for connecting two systems together to be operated as one system. It plays the interface for 30 channels of the call lines and 1 control channel. Signal types are three types; the PCM highway, the highway clock and the frame pulse.

Function	Description
Driver/receiver	Sending the PCM highway, the highway clock and the frame pulse in the system to another system. Three signals fore-mentioned are received from another system.
HDLC control	Converting the control data into the HDLC protocol, and sending it to another system through the PCM highway. The data of HDLC protocol from another system are converted into the normal data.
Clock watch function	Watching the PCM highway clock and the frame pulse from another system.

7) CALLER ID CARD (KX-TD193)

CALLER ID CARD is an optional card corresponding to "caller ID service" available in the north American market. This board is added on the CO card and detects the 300 bps modem signals transmitted during recesses between the bell signals from the station, and converts them into the parallel data.

One card is corresponded to the 4 lines. Two cards can be installed on the BASIC CO CARD (8 lines) and one card can be installed on the EXPANSION EXT CARD (4 lines).

8) BATTERY BACKUP ADAPTER (KX-A46)

BATTERY BACKUP ADAPTER is an interface option to connect the batteries. Using this option, when AC power turns off, it is powered from the batteries, and if the voltage at the battery terminals are derated under the specified voltage, it cuts the batteries off to prevent the over discharges.

3. EXPLANATION OF CIRCUIT OPERATION

3-1. BASIC

1) POWER SUPPLY UNIT

POWER SUPPLY UNIT consists of the following.

- Line Filter Section
- Rectifier and Smoothing Section
- Switching Section
- Control Section
- +15 V Circuit
- 15 V Circuit
- +5.3 V Circuit
- Bell Amp Circuit

POWER UNIT

■ Line Filter Section

Common mode noise is removed by C401, C402 and C405 to C406, and normal mode noise by L400 and L401. Lightening surges are absorbed by CR400, CR401 and SA400.

■ Rectifier and Smoothing Section

The input signal is full-wave rectified by bridge diode D400, and smoothed by C408, C409, resulting in a DC current. TH401 and TH402 are power thermisters.

■ Switching Section

The switching section is a basic RCC type which uses the IC400 included power MOS.FET. D401, R403 and C412 are for resetting the excitation energy stored in T400 while T400 is OFF. C410 and R408 are used as a snuffer for FET in IC400.

■ Control Section

IC400 is a RCC type switching regulator adopted power MOS.FET. The external circuit of IC400 has the following roles.

R401, R402, C111: For starting

R400: For detecting an electric current

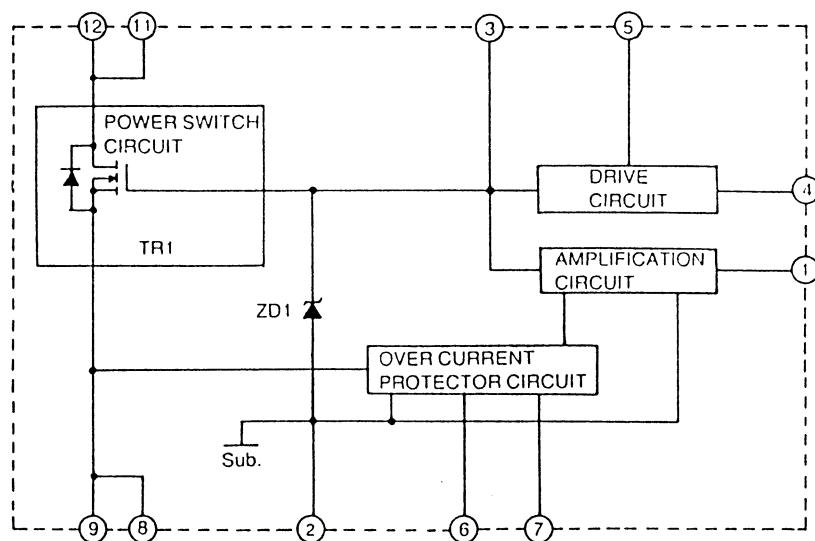
C417: For adjusting over current detector level

R404, C414: For compensating phase

R407, C415: For compensating over current protector circuit parts temperature dependence

PC400: For feed back

BLOCK DIAGRAM



■ +15 V Circuit

There are 2 output of switching transformer, T400 and +15 V is generated from the circuit connected to pin 12, 13-11. +15 V cannot be stabilized by oscillation control of the primary side since feed back is not done on the primary side from +15 V line. So, the chopper regulator, IC450 and the circuit around it stabilize +15 V. The following is the roles of main surrounding circuit.

D452, C454, C455: Rectifier and smoothing circuit

L450: For preventing resonance

R456, C459: For compensating phase

R457: For detecting an electric current

L451, C460: Filter

L454, C467: Filter

■ -15 V Circuit

The circuit connected pin 8, 9-10 of switch transformer T400 generates -15 V. With feed back on the primary side from -15 V line, -15 V is stabilized by the oscillation control of the primary side. The following is the roles of main surrounding circuit.

D451, C450: Rectifier and smoothing circuit

D450, Q450, C452: Feed back circuit

PC400, R451, R454,

VR450, R453,

L453, C468: Filter

■ +5.3 V Circuit

+5.3 V is generated from the chopper regulator, IC451 connected to the +15 V output. It has an over voltage protection circuit to prevent abnormal output voltage. The following is the roles of main surrounding circuit.

L452: Filter

R460: Electric current detection resistor

F401, SCR401: Over voltage chopper circuit

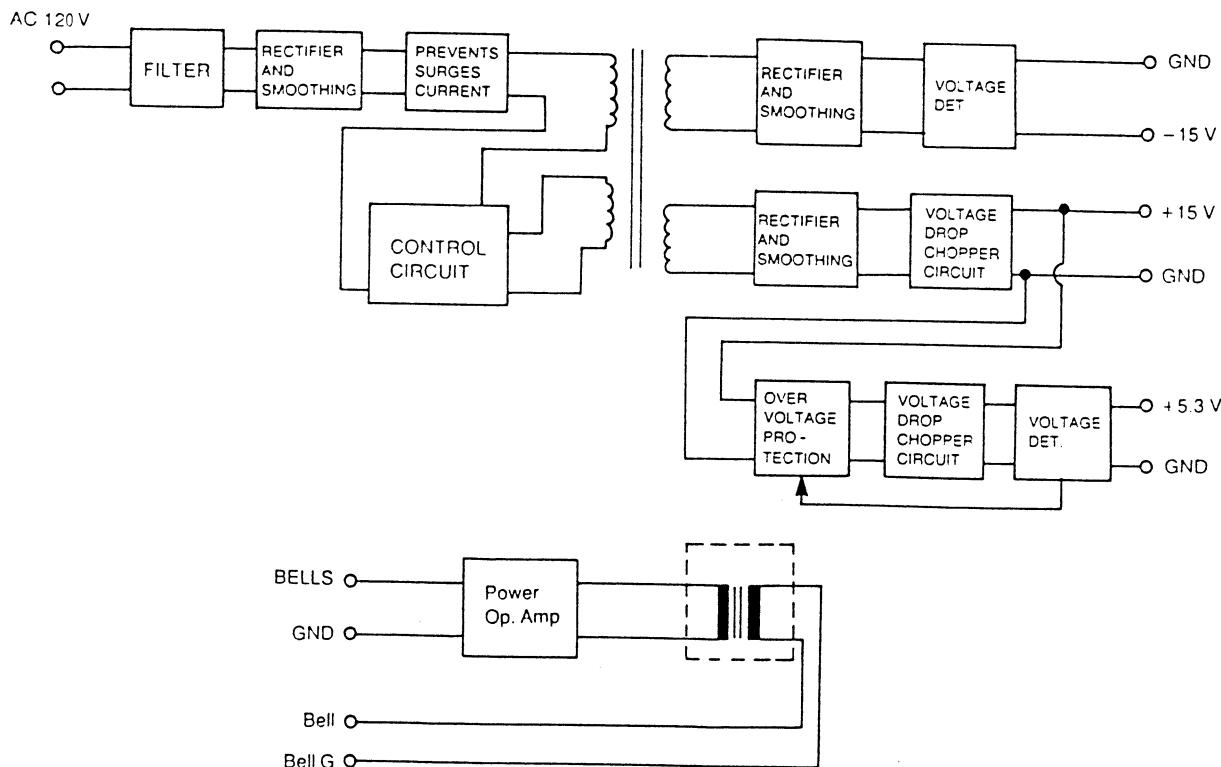
D453, R466: Over voltage detection circuit

R467, C465

■ Bell Amp Circuit

It increases bell signals sent from CPU board in Power Op. Amp, IC452 and sends them into the bell amp. Then, they are sent to the extension boards.

CIRCUIT DIAGRAM



2) CPU CARD

CPU CARD consists of the following:

- CPU Circuit
- TSW Circuit
- Conference Circuit
- Tone Generator Circuit
- Clock Generator Circuit
- Clock Circuit
- OHCA Circuit
- Hold Tone Circuit
- Battery Back-Up Circuit
- Voltage Watching Circuit
- RS-232C interface Circuit
- Level Signal Generator Circuit

■ CPU Circuit

Circuit Operation:

16 bit CPU (system clock=8.192 MHz)(IC1)

with 68HC000 core CPU

3 Serial I/O ports

16 bit Parallel I/O ports

3 level Interrupt Controller

16 bit Timer 3 ch.

Address Decoder

DTACK Controller

512 Kbyte EPROM (Program) (IC20, 21)

64 Kbyte SRAM (IC24, 25)

64 Kbyte Pseudo SRAM (IC22, 23)

Address Buffer (IC33, 34)

Data Buffer (IC31)

Control Signal Buffer (IC32, 35)

Gate Array (IC2)

with Address Decoder

Peripheral Controller

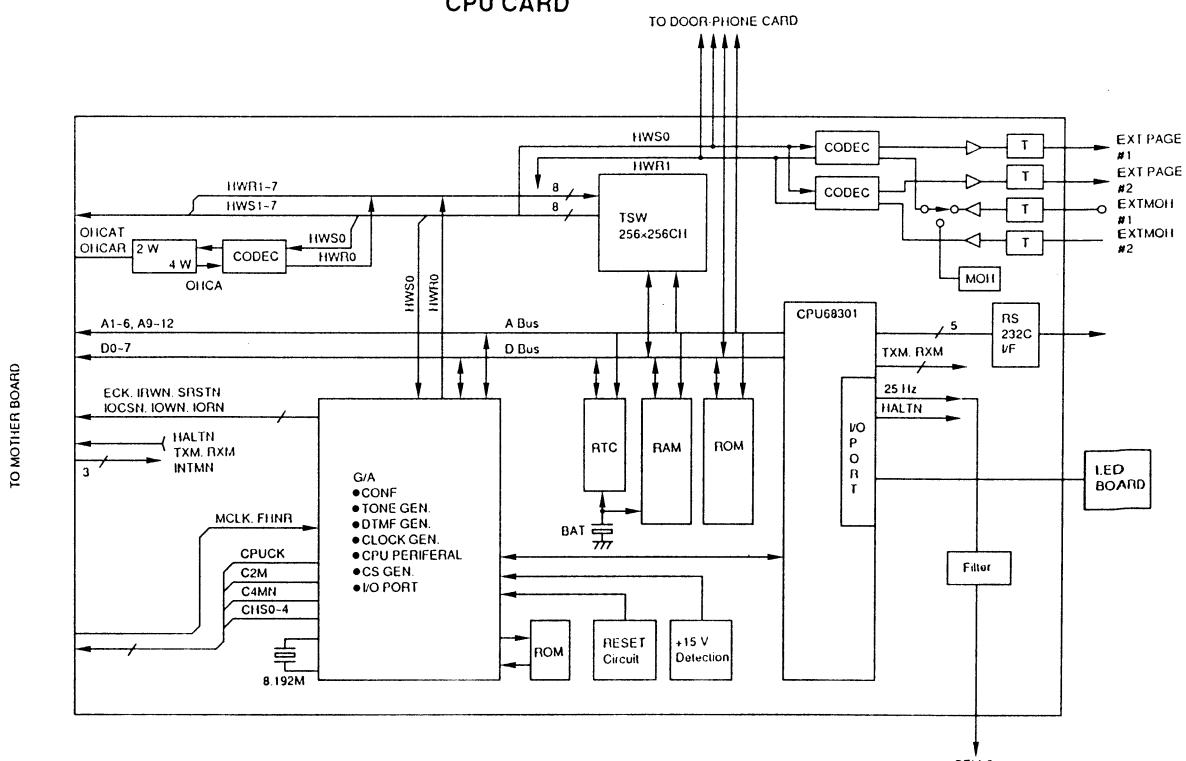
2 Parallel Out Ports

X'tal (8.192 MHz) (X1)

Composition:

The CPU (IC1) controls the system according to the programs stored in the ROM (IC20, 21). Part of the RAM (IC24, 25) area is backed up by batteries and stored the system data.

CPU CARD



■ TSW Circuit

Composition:

Time Switch IC (IC3)

Circuit Operation:

TSW (Time division Switch) Circuit exchanges totally 256 call channels, which is organized into the PCM highways of 8 lines, and one of the lines is composed of 32 channels. This circuit is integrated into one chip of LSI (IC3), and is controlled by the CPU (IC1) to present the data on the up highways of HWR0 through 7 to the down highways of HWS0 through 7.

The uses of each highways are shown below.

HW 0	Conference Circuit, Tone-DTMF Generator, External paging, Music ON HOLD, OHCA, Door-phone
HW 1	CO #1~#8
HW 2	EXT #1~#8
HW 3	EXT #9~#16
HW 4	EXT #17~#24
HW 5	EXT #25~#32
HW 6	CO #9~#12 DISA, REMOTE
HW 7	System Interconnection (SIC)

■ Conference Circuit

Composition:

Gate Array (IC2)

3 persons×6 conferences controller

128 Kbyte EPROM (Summation Table, Wave Data) (IC19)

Circuit Operation:

Conference Circuit is for enabling the three person's conference. This circuit is connected with HWS0 of the down highway and HWR0 of the up highway. After the voice data which are transferred to HWS0 at TSW are processed with the summation in this circuit, and are presented to HWR0 and transferred at TSW (IC13) again. This circuit consists of the Gate Array (IC2) and ROM (IC19). Gate Array (IC2) picks up the voice data, multiplies, makes ROM address, and sends to ROM. Conference operation is added by ROM table. The summation table of the PCM data is stored in ROM. ROM output is sent to Gate Array. Gate Array sets the data on the highway. This circuit covers 3-person×6-conference. This circuit function to reduce 6 dB of 2-persons' level out of 3-person to realize the conference call of 2-CO-person and 1-EXT-person.

■ Tone Generator Circuit

Composition:

same as Conference Circuit

Circuit Operation:

Tone Generator Circuit presents 4 kinds of the call progress tone and 2 channels of the DTMF tone to DHW0 of the down highway. This circuit consists of the Gate Array (IC2) and ROM (IC19) which are common to the conference circuit. ROM (IC19) are stored in the PCM data of the tone. Gate Array makes ROM address, gets tone data from ROM and sets the data on the highway.

■ Clock Generator Circuit:

Composition:

same as Conference Circuit

Circuit Operation:

Clock Generator Circuit is a circuit to generate PCM clock from X'tal (X1) and Gate Array (IC2).

The generated clocks are shown below.

C4MN:	4,096 MHz	Highway clock
C2M:	2.048 MHz	Highway clock
FH1N:	8 kHz	Frame pulse
CHS0~4:	128, 64, 32, 16, 8 kHz	Channel select signal
CP27~31:	8 kHz	Synchronous signal for CODEC

The sources of these clocks are the local OSC of 8,192 MHz crystal (X1) and 4,096 MHz from SIC. 4,096 MHz from SIC is used only in the slave mode when this system is connected with the another one as the inter-system connection. Switching the clock sources is controlled by CPU (IC1).

■ Clock circuit**Composition:**

Real Time Clock IC (IC26)

Circuit Operation:

Clock Circuit is a circuit which gives the clock function for this system, and consists of the clock IC (IC26) backed up by the batteries. This circuit presents one second interruption to CPU (IC1).

■ Hold tone circuit**Composition:**

CODEC IC (IC7, 8)
IC12, T4, T5, etc.

Circuit Operation:

The hold tone circuit is a circuit which presents the hold tone for the system. The tone sources are one system of the internal hold tone (as a local option) and two systems of the external hold tone. The internal hold tone and one of the external hold tone are switchable alternatively to be used (as a local option). The analogue signals from the tone sources are changed to the digital ones by CODEC IC (IC6) and presented to HWR0 of the up highway. The external hold tone circuit has AGC function.

■ External Paging Circuit**Composition:**

CODEC IC (IC7, 8)
IC10, T2, T3, etc.

Circuit Operation:

External Paging Circuit is a circuit which presents the voice to the external amplifier. This circuit converts the digital voice data on the HWS0 of the down highway to the analogue signals by CODEC, and presents the external paging port. This circuit consists of two systems.

■ OHCA Circuit**Composition:**

CODEC IC (IC6)
IC11, T1, etc.

Circuit Operation:

OHCA Circuit is a circuit which works as OHCA (Off Hook Call Announcement) function. This circuit converts 2 lines of OHCA path from the internal circuit to 4 lines, and carries out A/D and D/A conversion between HWR0 of the up highway and HWS0 of the down highway by CODEC (IC6).

■ Back Up Circuit**Composition:**

BAT, C1 etc.

Back Up Circuit is a circuit which has two functions as follows;

- Back up the CPU (IC1) peripherals for one second when AC power momentarily fails.
- Back up the Clock IC (IC26) and the part of RAM for 7 years.

Circuit Operation:

Back-up is done by the super capacitor (C1) at the momentary AC power failure, and the clock IC and RAM are backed up by the lithium of secondary battery (BAT).

■ Voltage Watching Circuit**Composition:**

Reset IC (IC13)
Q6, 7 etc.

Circuit Operation:

Voltage Watching Circuit is a security circuit which detects the deration of +5 V and +15. If +5 V is derated, this circuit resets the system. If +15 V is derated, this circuit presents "L" to I/O port in CPU.

The deration of +15 V means AC power off.

■ RS-232C Interface Circuit

Composition:

Receiver/Driver IC (IC15, 16)
16 bit CPU (IC1)

Circuit Operation:

RS-232C Circuit is a circuit for realizing the data transmission between CPU 68301 (IC1) and a personal computer/printer etc. This circuit consists of a serial interface built in CPU and the level conversion circuit. When the power turns on, the power supply for the RS-232C driver (IC15, 16) is controlled by CPU to prevent the indefinite data presentation.

■ Level Signal Generator Circuit

Composition:

16 bit CPU (IC1)
IC14, etc.

Level Signal Generator Circuit is a circuit which generates the bell signal to the SLT of EXT. This circuit is composed of the out-put port in CPU (IC16), the filter and the power amplifier (IC14), and generates the bell signal.

3) BASIC CO CARD

BASIC CO CARD consists of the following:

Call Interface
Parallel I/O Circuit
Timing Signal Generation Circuit

■ Call Interface Circuit

Call Interface Circuit is a circuit which works as the interface between the call line and the PCM highway, and is classifies as following circuits.

Composition:

- (a) Bell Signal Detection Circuit
- (b) DC loop formation Circuit
- (c) Pulse Dial Transmission Circuit
- (d) 2 W~4 W Lines Conversion Circuit
- (e) A/D, D/A Conversion Circuit
- (f) Diagnostic Circuit

Call Interface Circuit consists eight lines corresponding to each call line.
(Transfer Circuit at Power Failure are four lines.)

Circuit Operation:

(a) Bell signal Detection Circuit

When CO line is idle, EXRLY pin of IC111 is low and RLY101 is OFF, photocoupler PC101, PC102, are OFF. BELL pin of IC111 is high. When there is an incoming signal at the CO line, the call signal is rectified by zener diode D102 and D103 and photocoupler PC101, current flows to the photocoupler PC101, and PC101 turns ON. This causes BELL pins of IC111 to change from a high to low. This change is detected as incoming call thus processing are executed.

Call Signal Path:

Tip-L102-L104-RLY101 (6-7)-PC101 (1-2)-R101-C102-RLY101 (2-3)-L103-L101-SA103 (4-2)-Ring

(b) DC Loop Formation Circuit

In the off-hook mode, EXRLY of IC111 is low, and RLY101 is OFF.

DC Loop Path:

Tip-L102-L104-RLY101 (6-7)-R118-D101 (—+)-PC102 (4-3)-Q101
D101 (—~-)F100-RLY101-L103-L101-SA103 (4-2)-Ring

(c) Pulse Dial Transmission Circuit

When off-hook, pulse dial transmission is executed by alternating on-hook and off-hook.

On-hook and off-hook is controlled by PC102. During the make position, dial pin of IC111 is low level and PC102 is ON. During the break position, dial pin of IC111 is high level and PC102 is OFF.

At this time, BELL pin of IC111 become a low. Afterwards, BELL pin of IC111 monitors for a change (low to high) for more than 400 ms. If more than 400 ms has been detected it assumes that an on-hook state has occurred and the CO line circuit is restored to the idle state. The voice signal is transmitted into the system via the transformer T101.

(d) 2 W-4 W Lines Conversion Circuit

This circuit converts 2-line analogue signals from CO line to 4-line signals. The voice analog signal from the line is outputted from T101 to the 2-4 Line Conversion Circuit, and the circuit flow is T101 (4-6)-R116-5 pin of IC102

IC102 is a CODEC. The voice analog signal is converted to PCM signal by this CODEC. PCM signal from TSW is converted to voice analog signal by the CODEC. And the circuit flow is as following.
2 pin of IC102-C108 R112-2 pin of IC101-R107-T101

(e) A/D, D/A Conversion Circuit

This circuit is for conversion between 4-line analogue signals and the PCM digital signals. CODEC (IC102) has a power down function at no operation and a μ /A law switching over function, and are controlled through the parallel I/O port.

(f) Diagnostic Circuit

This circuit is a circuit which checks the function of CO cards. This circuit is composed of the relays (RLY101) which connect the path for the interface circuit of #1 (or #9) line in EXT card. The function check of the DTMF receiver circuit on EXT card. The function check of the DTMF receiver circuit on EXT card can be done by presenting the DTMF signals from CO card.

When EXRLY pin of IC111 becomes high, RLY101 turns ON and make the path.

■ Parallel I/O Circuit

Composition:

Gate Array
IC114, 116, 117, 121, 123

Circuit Operation:

Parallel I/O Circuit is a I/O port for controlling the Call Interface Circuit, and is composed of one gate array (IC111).

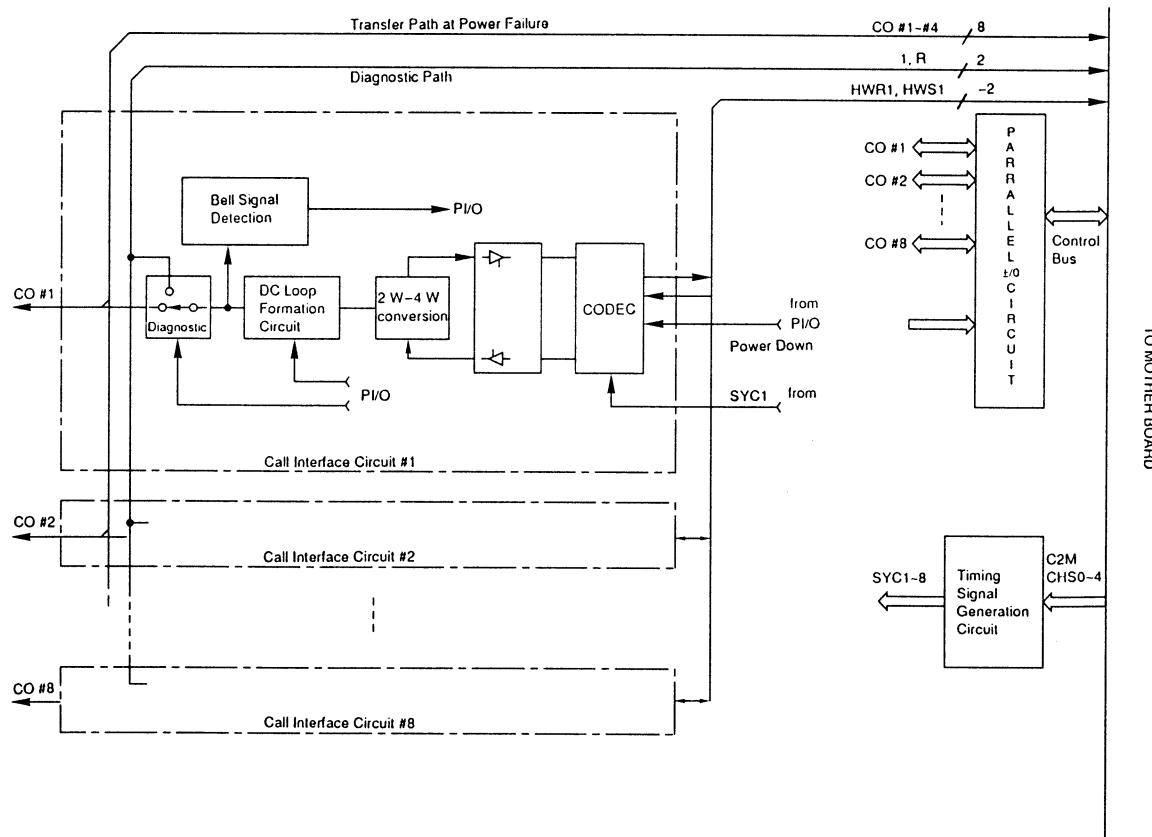
■ Timing Signal Generation Circuit

Composition:

IC112, 120, 121, 122

Circuit Operation:

Timing Signal Generation Circuit is a circuit which generates the synchronous signals for CODEC. It generates eight kinds of signals from the channel select signals (CH0-4) presented by the CPU CARD and from the highway clock (C2M).

BASIC CO CARD

4) BASIC EXT CARD

BASIC EXT CARD consists of the following:

- Analogue Telephone Circuit
- DTMF Receiver Circuit
- APITS Data Communication Circuit
- DPITS Data Communication Circuit
- HDLC Controller
- APITS/DPITS Data Transmission And Reception Circuit
- Parallel I/O Port
- Timing Signal Generation Circuit

■ Analogue Telephone Circuit

Analogue Telephone Circuit is composed of the following circuit, this consists of eight circuit corresponding to each extension line.

Composition:

- (a) Current Supply Circuit
- (b) Hook Detection Circuit
- (c) Ring Trip Detection Circuit
- (d) 2-4 Lines Conversion Circuit
- (e) A/D and D/A Conversion Circuit
- (f) Transfer Circuit At Power Failure
- (g) Diagnostic Circuit

Circuit Operation:

(a) Current Supply Circuit

Current Supply Circuit is constant-current circuit which supplies the call current to SLT. Its voltage is ± 15 V.

With the telephone off-hook, a DC loop is formed, and current is supplied to the telephone. This Current is limited to about 30 mA by D204, D205, R205, D206, D207 and R208 respectively.

(+15 V)-R206-R205-Q203-RLY202 (b-c)-RLY201 (c-b)-L204-RLY200 (m-c)-Telephone-RLY200 (c-m)-L205-RLY201
(b-c)-RLY202 (c-b)-Q204-R208-R209-(-15 V)

(b) Hook Detection Circuit

Hook Detection Circuit is a circuit which detects On-hook or OFF-hook of SLT when the bell signals are not presented, and detects the dial pulse as well.

When the telephone handset is taken off the hook, a DC loop is formed and current flows to Q205. Because of this, the corrector of Q205 changes from high to low, thus HOOK pin of IC211 becomes low, and the CPU detects an off-hook condition. When the handset is replaced back on hook, the DC loop is interrupted and current no longer flows to Q205 and the corrector of Q205 goes high and the CPU assumes an on-hook condition.

(c) Ring Trip Circuit

This circuit is for detecting Off-hook of SLT when the bell signals are presented.

Normally Q206 is OFF during transmission of the bell signal. When answering the telephone, the DC loop of the call signal circuit is established, Q206 then turns ON, and base of Q207 becomes low. Because of this, the corrector of Q207 becomes high and RLY202 is reset. With resetting of RLY202, the loop of bell signal circuit is interrupted and the DC loop of the call circuit is established.

(d) 2 W-4 W Lines Conversion Circuit

This circuit converts 2-line analogue signals from SLT and APITS to 4-line signals.

The voice analog signal from the line is outputted from C205 to the 2-4 Line Conversion Circuit, and the circuit flow is C205-R219-6 Pin of IC202-R217-5 Pin of IC201

IC201 is a CODEC. The voice analog signal is converted to PCM signal by the CODEC. PCM signal from TSW is converted to voice analog signal by the CODEC. And the circuit flow is as following.

2 Pin of IC201-C208-R215-2 Pin of IC202-R211-C205-RLY202 (B-C)-RLY201 (C-B)-L204-RLY200 (M-C)-Telephone

(e) A/D and D/A Conversion Circuit

This circuit is for conversion between 4-line analogue signals and the PCM digital signals. CODEC (IC201) has a power down function at no operation and a μ A law switching over function, and is controlled through the parallel I/O port.

(f) Transfer Circuit at Power Failure

This circuit is a circuit for connecting directly between CO line and SLT when the power fails. The call line is automatically changed to the direct call mode when the voltage of +15 V is derated (Power down). It is controllable through I/O port as well. This circuit exists only in the extension of #1~#2, and CO #3~#4 are connected with EXT #9~#19. This circuit maintains the current mode for over one second when AC power fails momentarily.

When power fails or 117 pin of IC211 becomes low, corrector of Q221 is high, RLY200 turns OFF and make the path.

(g) Diagnostic Circuit

This circuit is a circuit which checks the function of CO cards. This circuit exists only in the extension of #1 (or #9), and is composed of the relay (IC211) which connects the paths for the interface circuit of each line in CO card in stead of telephone terminals. The function check of the DTMF receiver circuit on this card can be done by presenting the DTMF signals from CO card. When EXRLY pin of IC211 becomes high, RLY201 turns ON and makes the path.

■ DTMF Receiver Circuit

Composition:

DTMF Receiver IC (IC215, IC216)
8→1 Analogue Switches (IC217, IC218)

Circuit Operation:

DTMF Receiver Circuit is a circuit for receiving the DTMF dials presented by SLT and APITS. This circuit is composed of the 8→1 Analogue Switches (IC217, 218) and the DTMF Receiver IC (IC215, 216). This circuit is incorporated two lines on one card, each line is connected through the eight extensions and the analogue switches (IC217, 218) to the DTMF receiver IC (IC215, 216). The received data of DTMF receiver are read through the data bus by the main CPU (IC1).

■ APITS Data Communication Circuit

Composition:

Gate Array (IC211)

Circuit Operation:

APITS Data Communication Circuit is a circuit which performs the serial/parallel conversion of the control data between APITS comm. paths and the main CPU (IC1). This circuit covers 8 lines corresponding to each extension, and 8 lines are integrated into one Gate Array (IC211).

■ DPITS Data Communication Circuit

Composition:

Gate Array (IC211)

Circuit Operation:

DPITS Data Communication Circuit is a circuit which has the following functions. This circuit covers 8 lines corresponding to each extension, and 8 lines are integrated into one Gate Array (IC211).

•B channel communication

The B channel data are transferred between the DPITS comm. path and the PCM highway. The transmitting capability is 64 kbps×2.
Note) B channel stands for "Barer Channel", normally transmitting the voice data.

•D channel communication

The data are transferred between the DPITS comm. path and the HDLC controller, serial bus.

The transmitting capability is 16 kbps. Because the communication between HDLC controller and this circuit is done as 1 vs. 1, the HDLC controller switches the communicating extension every for 8 ms. Therefore, the communication per one extension is done only for 8 ms at 64 ms cycles, the actual transmitting capability is 2 kbps.
Note) D channel stands for "Data Channel", transmitting CPU control data.

•C channel communication

The serial/parallel data conversion are done between the DPITS comm. path and the main CPU data bus. The level (H or L) transmission is only possible through the C channel.

Note) C channel stands for "Control Channel".

■ HDLC Controller

Composition:

HDLC Controller IC (IC213)

Circuit Operation:

HDLC Controller is a circuit which functions the data format conversion of the D channel between the DPITS comm. line installed with a Gate Array (IC211) and the CPU data bus by following the HDLC protocol. The serial/parallel conversion is done at the same time. Though this circuit communicates with 8 channel of the DPITS comm. circuit, since it can communicate only with one channel at a time, as before mentioned it, switches the communicating extension every for 8 ms.
This circuit is composed of one IC (IC213).

■ APITS/DPITS Data Transmission and Reception Circuit

Composition:

Q201, Q208, IC203, T201 etc.

Circuit Operation:

The circuit functions the wave shaping and the level conversion between the date line from the telephone terminal and the Gate Array (IC211), and supplies the current to the terminal through the data line. The data communication is done through this circuit with any kinds of the terminal whichever APITS or DPITS.

This circuit consists of the drive circuit (Q201, Q208, etc.), the receive circuit (IC203) and the transformer (T201).

■ Parallel I/O Port

Composition:

Gate Array (IC211)

Circuit Operation:

This circuit is a circuit which controls the analogue telephone circuit, and integrated into the Gate Array (IC211).

■ Timing Signal Generation Circuit

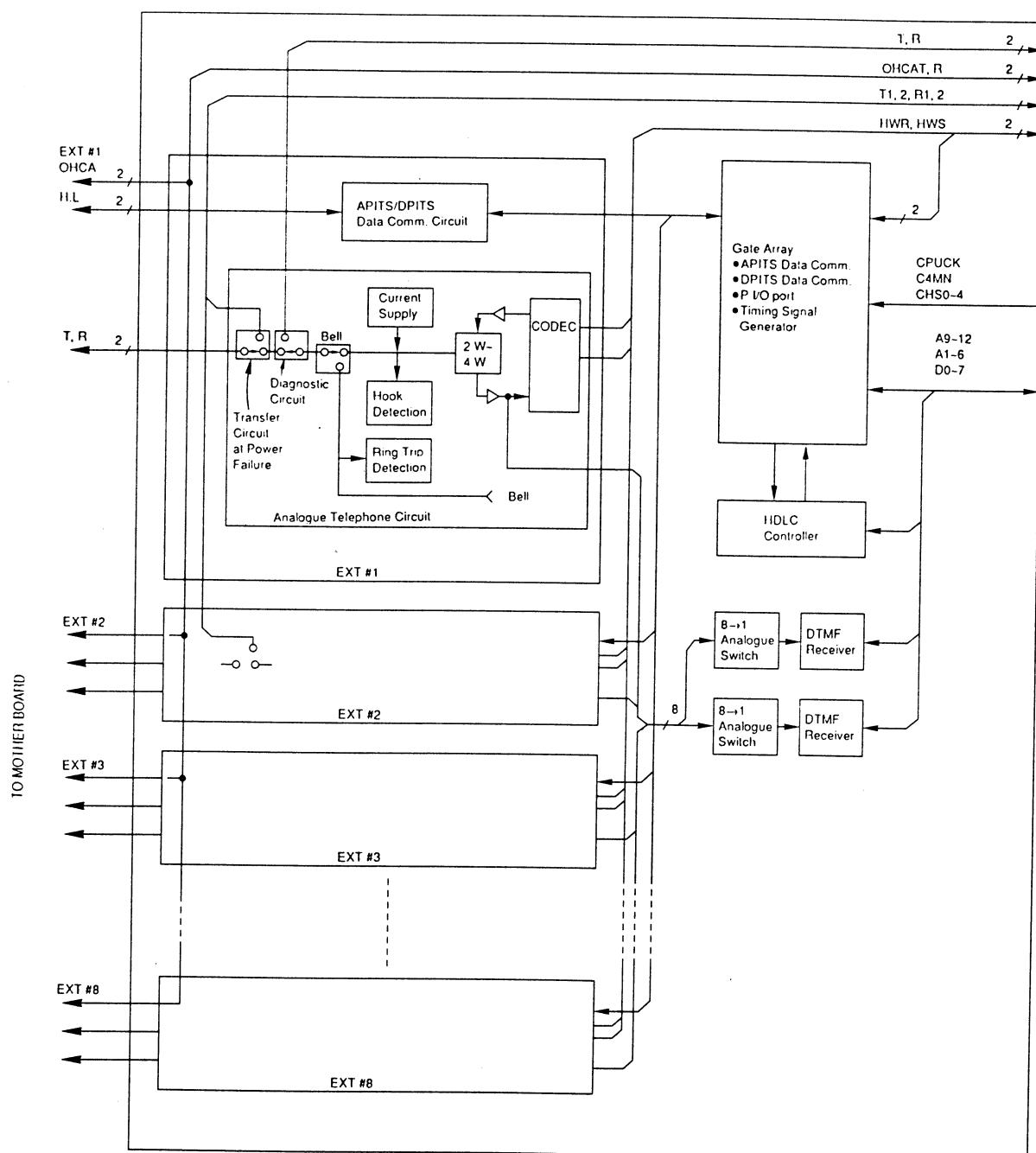
Composition:

Gate Array (IC211)

Circuit Operation:

This circuit is a circuit which generates the synchronous signal for CODEC (IC201) and the frame pulse for the HDLC controller (IC213). These signals are generated from the channel select signals (CHS0~4) and the highway clock (C4MN) presented by the CPU Card and integrated into the Gate Array (IC211).

BASIC EXT CARD



3-2. RESOURCE OF OPTION

1) EXPANSION CO CARD (KX-TD180)

The circuit on this card has the following differences from the BASIC CO CARD. Others are the same as the basic one.

- Number of CO lines are four.
- Two lines paths for the transfer at power failure.

2) EXPANSION EXT CARD (KX-TD170)

The circuit on this card has the following differences from the BASIC EXT CARD. Others are the same as the basic one.

- No diagnostic circuit for CO CARD
- Two lines paths for the transfer at power failure

3) DOOR-PHONE CARD (KX-TD160)

DOOR-PHONE CARD consists of the following:

Door-Phone Interface Circuit
Door Opener Circuit

■ Door-Phone Interface Circuit

Door-Phone Interface Circuit is a circuit which functions the interface between the door-phone and the PCM highway, and is composed of the following circuits.

Composition:

- (a) Circuit for detection whether the door-phone is connected or not.
- (b) Current supply circuit
- (c) Hook detection circuit
- (d) 2-4 lines conversion circuit
- (e) A/D and D/A conversion circuit (CODEC) IC2

Circuit Operation:

(a) Circuit for detection whether the Door-Phone is connected or not.

When the Door-Phone is not connected, base of Q2 is high. When corrector of Q2 is low, input pin of IC5 is low. When the Door-Phone is connected, base of Q2 is low. When corrector of Q2 is high, input pin of IC5 is high. CPU (IC1) on CPU CARD gets information through IC5 whether the Door-Phone is connected or not.

(b) Current Supply Circuit

Q3 supplies current to the Door-Phone line through the transformer (T1).

(c) Hook Detection Circuit

When the call button of Door-Phone isn't pushed, base of Q1 is high. When corrector of Q1 is low, input pin of Q1 is low. When the call button of Door-Phone is pushed, base of Q1 is low. When corrector of Q1 is high, input pin of IC5 is high. CPU (IC1) on CPU CARD gets information through IC5 whether the call button is pushed or not.

(d) 2-4 Lines Conversion Circuit

This circuit converts 2-line analogue signals to 4-line signals.

(e) A/D, D/A Conversion Circuit

This circuit is for converting the analogue signals from Door-Phone to the PCM digital signals to present to the PCM highway, and also converting the data on the PCM highway into the analogue signals to the Door-Phone. This circuit has the power down function and the μ/A conversion function.

■ Door Opener Circuit

This is the relay circuit which controls the Door Opener connected externally. The control is made through the parallel I/O port (IC4). Two of this circuit are installed on a card.

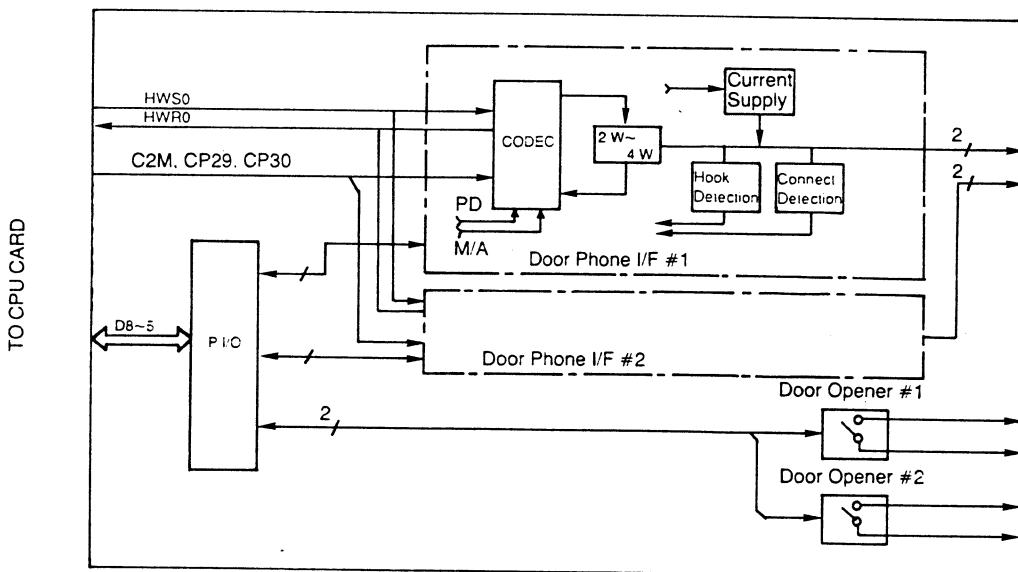
Composition:

IC4, Q7, RLY1, etc.

Circuit Operation:

When CPU (IC1) on CPU CARD make I/O port (IC4) high, transistor (Q7) controls the relay (RLY1) ON. When CPU (IC1) on CPU CARD make I/O port low, transistor controls the relay OFF.

DOOR-PHONE CARD



4) REMOTE CARD (KX-TD196)

REMOTE CARD consists of the following:

MODEM Circuit

A/D and D/A Conversion Circuit

Timing Signal Generation Circuit

CPU Interface Circuit

■ MODEM Circuit

Composition:

IC8, IC14, X1, etc.

Circuit Operation:

MODEM Circuit is connected with the CPU (IC1) on CPU CARD and the serial data bus, and converts the serial data from CPU into the MODEM signal to present for CODEC (IC13), also converts the MODEM signal from CODEC into the serial data to transmit for the CPU. MODEM function is executed by one IC (IC14).

■ A/D and D/A Conversion Circuit

Composition:
CODEC IC (IC13)

Circuit Operation:

This circuit is for converting the analogue signals from MODEM circuit to the PCM digital signals to present to the PCM highway, and also converting the data on the PCM highway into the analogue signals to the MODEM circuit. This circuit has the power down function and the μ A conversion function.

A/D and D/A Conversion Circuit is composed of one IC (IC13).

■ Timing Signal Generation Circuit

Composition:
IC1, IC4, IC10, IC11

Circuit Operation:

This circuit is a circuit which generates the synchronous signals for CODEC (IC13). The signals are generated from the channel select signals (CHS 0~4) and the highway clock (C2M) presented by the CPU CARD.

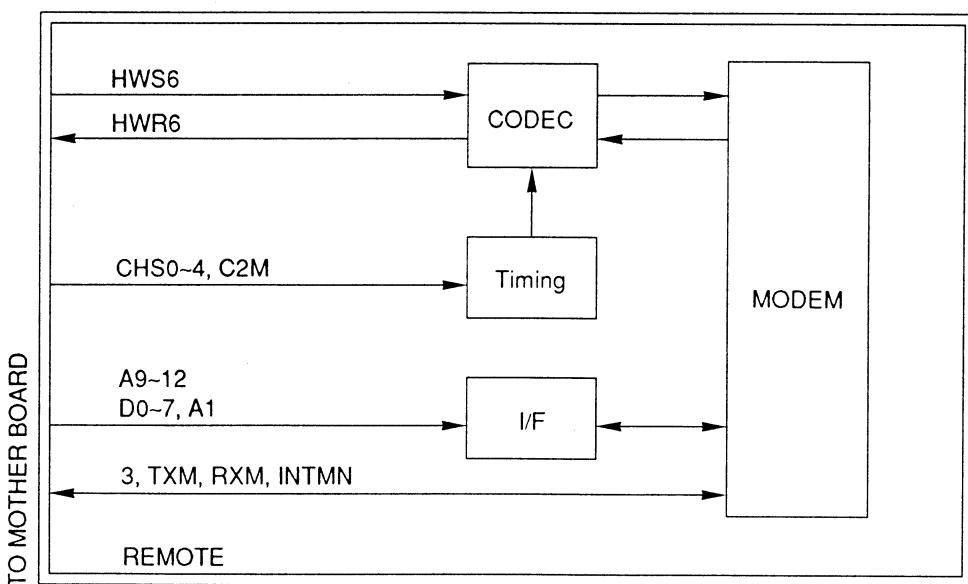
■ CPU Interface Circuit

Composition:
IC1, IC2, IC3, IC4, IC5, IC7, IC9, IC10, IC12

Circuit Operation:

As the address bus and the data bus are multiplied in the MODEM IC, this circuit makes the address bus and the data bus to be multiplied.

REMOTE CARD



5) DISA CARD (KX-TD191)

DISA CARD consists of the following.

CPU Circuit

Parallel FIFO (First In First Out) Memory Circuit

ADPCM CODEC Circuit

OGM (Out Going Message) Memory Circuit

DTMF Repeat Circuit

End of Call Detection Circuit

Highway Control Circuit

Timing Signal Generator Circuit

■ CPU Circuit

Composition:

68C03 8 bit CPU (IC1)

ROM 32 kbite (IC2)

SRAM 8 kbit (IC3)

IC7, IC25, IC27, IC32, IC36, IC46

Circuit Operation:

This circuit is a circuit which controls the DISA CARD according to the program in the ROM (IC2) by the CPU (IC1). It is connected with main CPU on CPU CARD through the Parallel FIFO Circuit, and controls this card by following the commands from the main CPU.

■ Parallel FIFO Memory Circuit

Composition:

Gate Array (IC5)

IC6, IC37, IC38, IC39, IC40, IC41

Circuit Operation:

Parallel FIFO Memory Circuit is a circuit which functions the data communication interface between the DISA-CPU and the main CPU on CPU CARD. This circuit has each 16 bite buffer in the up and down directions. This FIFO memory is functioned by Gate Array (IC5).

■ ADPCM CODEC Circuit

Composition:

ADPCM IC (IC53, IC54)

CODEC IC (IC57, IC58, IC61)

AGC Circuit (IC70, Q7, Q8, etc.)

Path Selector (IC37, IC38, IC42, IC43, IC)

Circuit Operation:

This circuit is a circuit which converts the ADPCM data of OGM (Out Going Message) stored in RAM (IC48, IC49) into the PCM CODEC data, and presents to UHW 0 of the up highway.

Two of this circuit are installed on one card, and one of them has the OGM recording function as well. In another words, it takes in the PCM CODEC data on DHW 6 of the down highway through the AGC circuit and converts to the ADPCM codes.

The data transmission between this circuit and RAM (IC48, IC49) is done by CPU (IC1). The transmitting rate is 1 Bite/250 μ S. This circuit is composed of the ADPCM IC with serial/parallel converter and parallel/serial converter (IC53, IC54), CODEC IC (IC57, IC58, IC61) and the AGC Circuit (only one circuit).

The coding rate of ADPCM is 32 Kbps.

■ OGM Memory Circuit

Composition:

SRAM 2 Mbit (IC48, IC49)

Battery (BAT), etc.

Circuit Operation:

This circuit is RAM (IC48, IC49) which stores the ADPCM data of OGM by CPU (IC1). With 2 Mbit capacity, two messages each for 32 seconds can be recorded. This circuit is backed up by battery (BAT).

■ DTMF Repeat Circuit

Composition:

CODEC IC (IC20, IC21)

Filter IC (IC13, IC14)

DTMF Transceiver IC (IC9, IC10)

Circuit Operation:

This circuit is a circuit which receives the DTMF signal (IC9, 10) through the highway (IC20-IC13, IC21-IC14) once and resends (IC9, 10) to the highway (IC20, IC21) to cover the level reduction of the DTMF tone caused by the line loss during CO-CO call. Normally, output of this circuit is open, and once it detects the DTMF signal (IC9, 10) at CO-CO call, the output connects with UHW 6 of the up highway and then resends the DTMF signal (IC9, 10).

Also this circuit is used as the DTMF receiver (IC9, 10), and receives the secondary dial when the DISA signal incoming. Two of this circuit are installed on one card (TS16, TS18 of DHW6).

■ End of Call Detection Circuit

Composition:

PI0 (IC4)

IC24, IC26, IC28, IC30, etc.

Circuit Operation:

This circuit is a circuit which detects the end of call at CO-CO call.

It converts whether the voice exists or not into the logic level (IC24, 26, 28, 30), then presents it to CPU (IC1) through PI0 (IC4). There are three methods for detecting the end of call as follows.

- No tone detection
- Cyclic tone detection
- Continuous tone detection

The four of this circuit are installed corresponding to each time slot of TS16~19.

■ Highway Control Circuit

Composition:

IC37, IC42, IC43, IC67, IC71

Circuit Operation:

This circuit is a circuit which transfers the data in the HWS 6 of the down highway onto HWR 6 of the up highway for calling between CO and CO. TS16~19 are controlled individually.

The CPU (IC1) controls the gate IC (IC34, 42, 43, 67, 71) through PI0 (IC4), connects DHW 6 and UHW 6.

■ Timing Signal Generator Circuit

Composition:

IC39, IC40, IC62, IC63, IC64, IC65

Circuit Operation:

This circuit is a circuit which generates the timing signals for using for ADPCM, CODEC Circuit and Highway Control Circuit. These signals are generated from the channel select signals (CH0~4) and the highway clock (C2M, C4MN) which are presented from the CPU CARD.

DISA BLOCK DIAGRAM

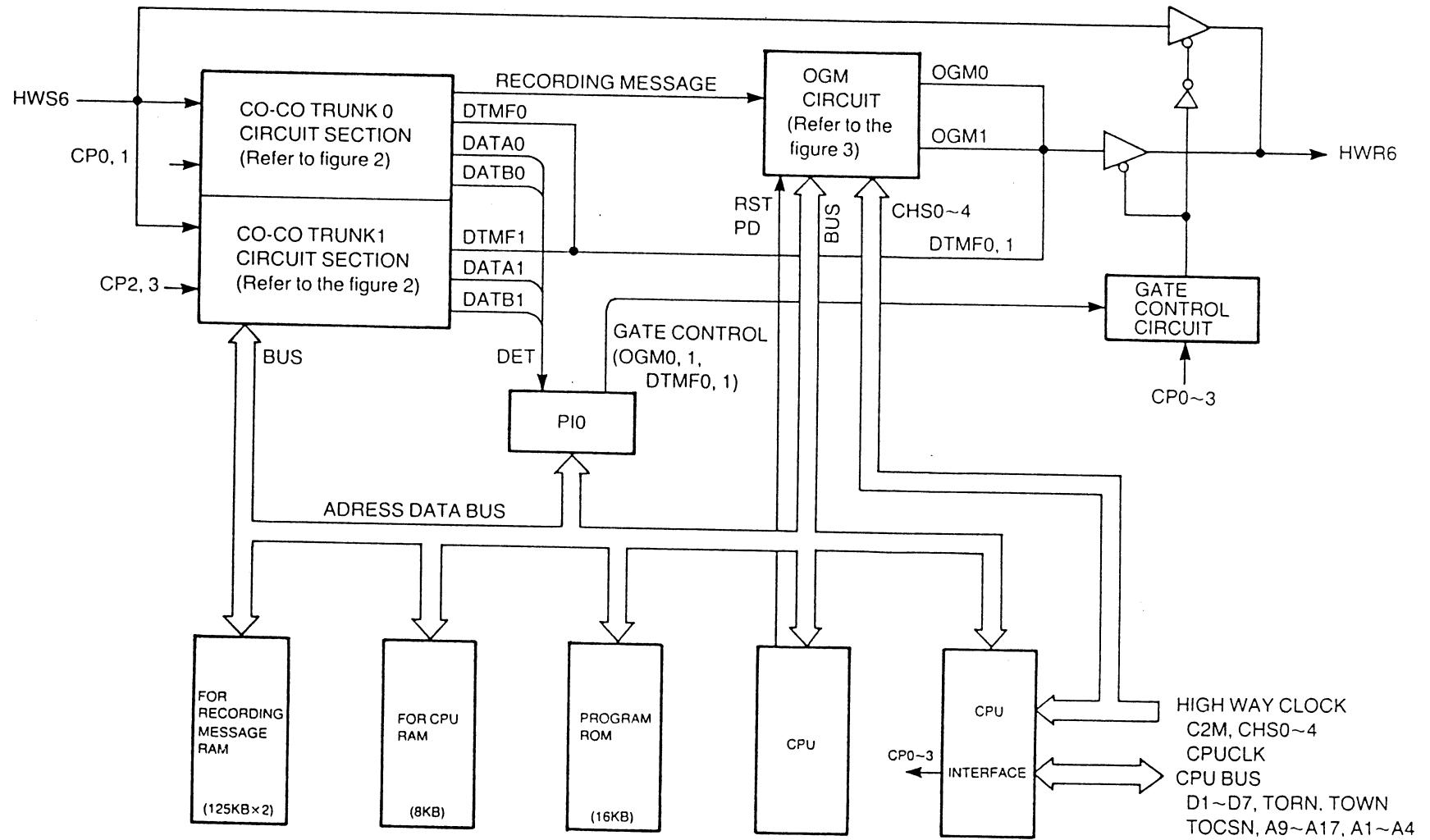
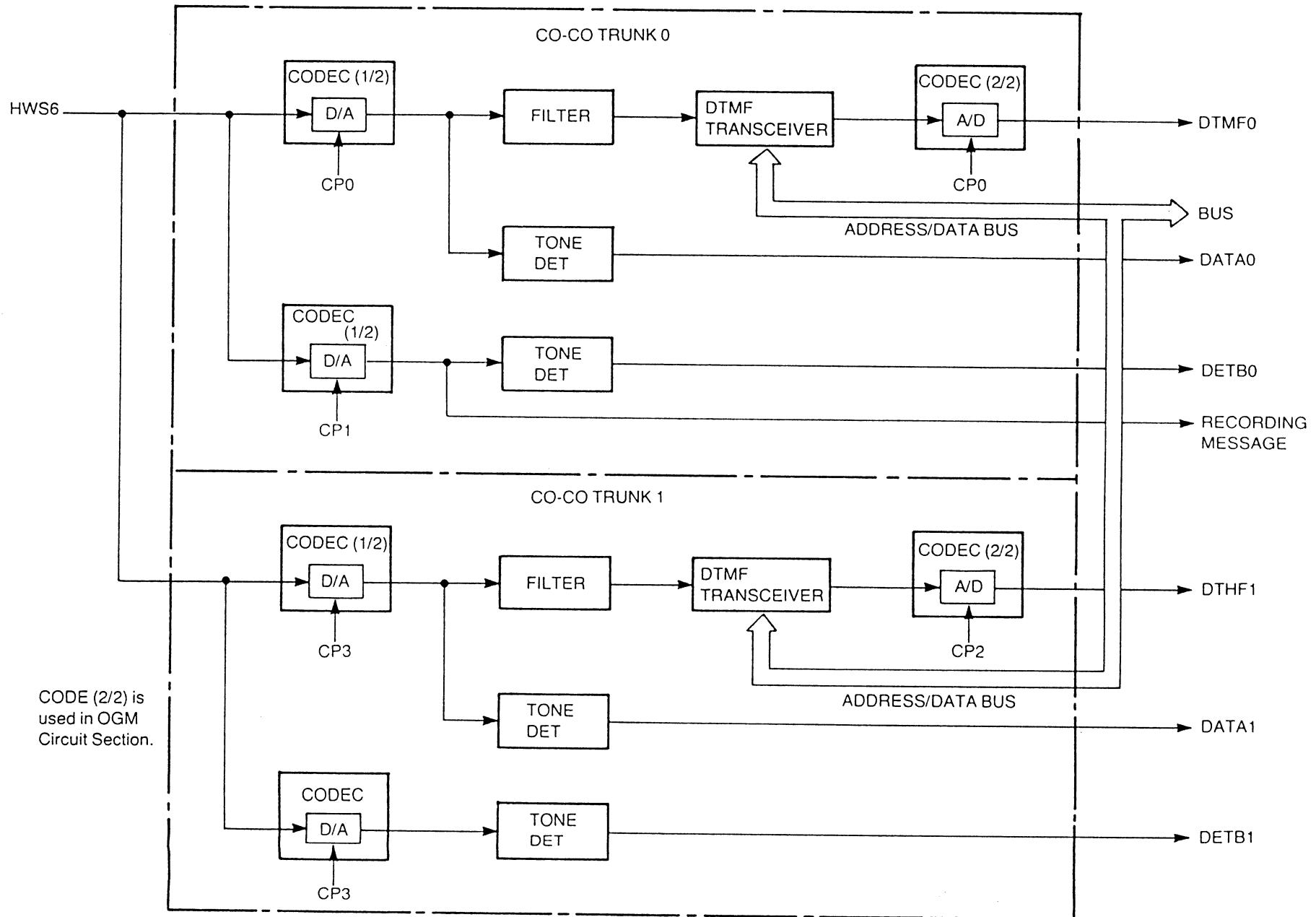
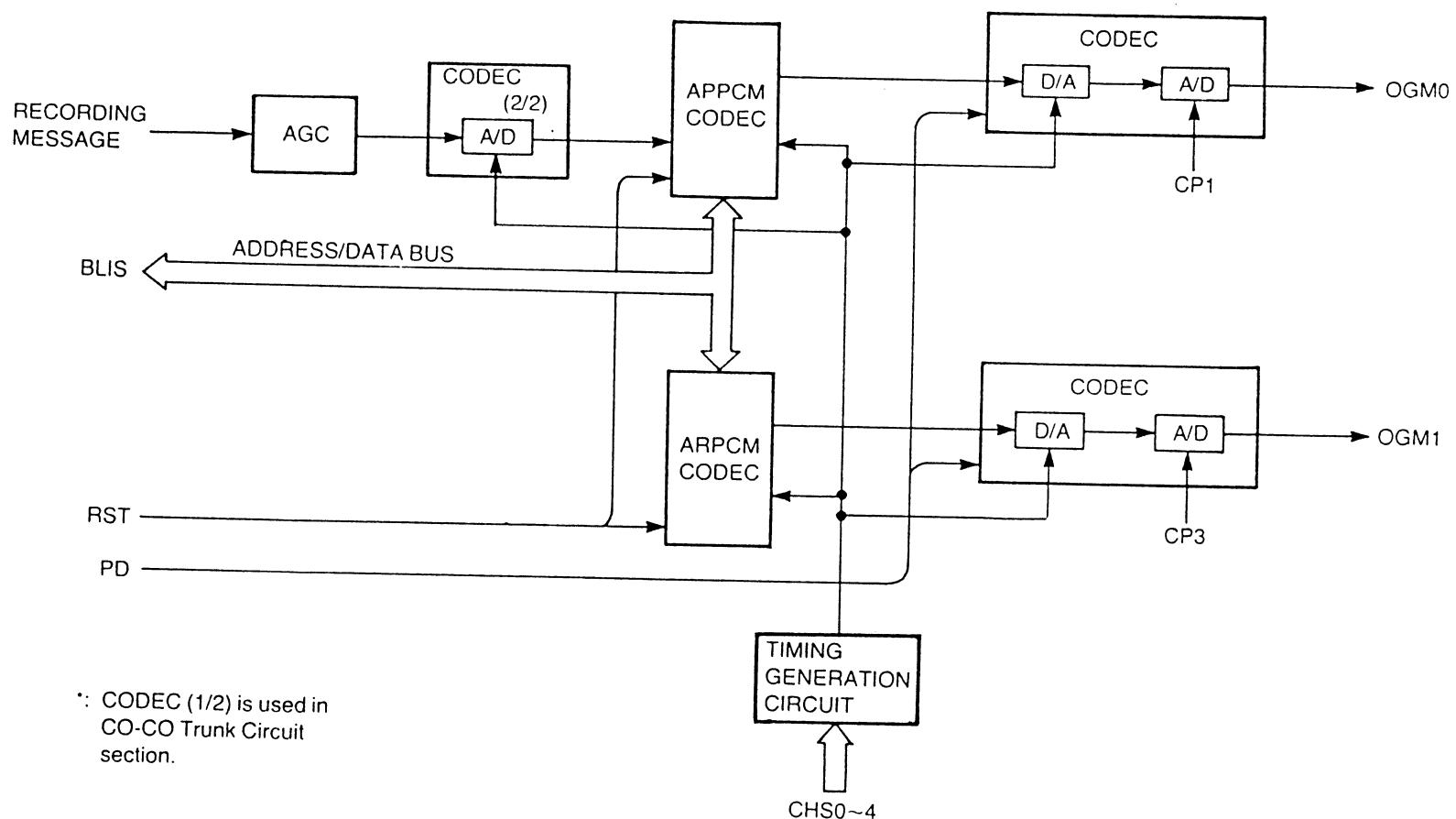


Figure 1

CO-CO TRUNK 0, 1 CIRCUIT



OGM CIRCUIT SECTION



* CODEC (1/2) is used in
CO-CO Trunk Circuit
section.

6) SYSTEM INTERCONNECTION CARD (KX-TD192)

SIC CARD consists of the following.

HDLC Controller

Timing Signal Generator Circuit

Sending and Receiving Circuit

Clock Guard Circuit

■ HDLC Controller

Composition:

HDLC Controller IC (IC115)

Circuit Operation:

HDLC Controller is a circuit which performs the conversion of the data format according to the HDLC protocol between main CPU on CPU CARD and the PCM highway connected with another system. It works as the serial/parallel converter at the same time.

■ Timing Signal Generator Circuit

Composition:

IC117, IC119

Circuit Operation:

This circuit generates the frame pulse which are presented to the another system, and also generates the signals for the data transmission between the HDLC controller and the PCM highway. These signals are generated from the channel select signals (CHS0~4) and the highway clock (C2M, C4MN) presented by the CPU CARD.

■ Sending and Receiving Circuit

Composition:

IC107, IC108, IC109, etc.

Circuit Operation:

This circuit sends the PCM highway, the highway clock and the frame pulse from the system to the another system (IC109), and receives those signals from the another system (IC108). Interface is RS-422.

■ Clock Guard Circuit

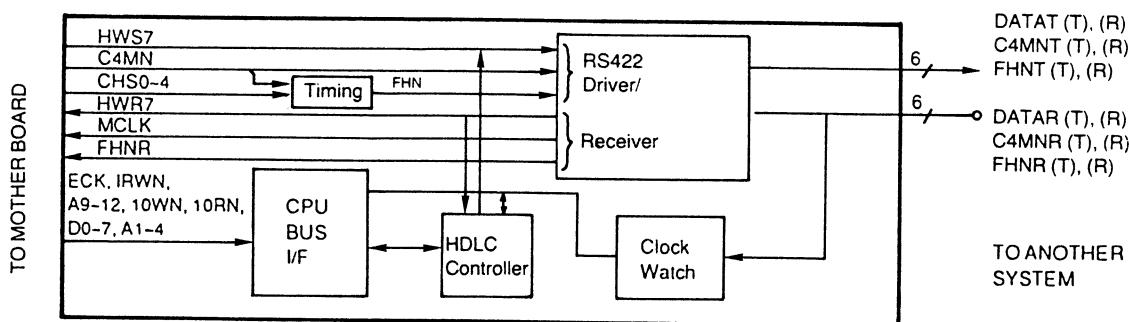
Composition:

IC121, IC122, etc.

Circuit Operation:

This circuit watches the PCM highway clock, the highway clock and the frame pulse from another system.

SYSTEM CONNECTION CARD



7) CALLER ID CARD (KX-TD193)

CALLER ID CARD consists of the following:
MODEM Signal Receiver Circuit
Serial/Parallel Converter Circuit
Over Voltage Protector Circuit

■ MODEM Signal Receiver Circuit

Composition:
 IC301, IC302, IC303, IC304, etc.

Circuit Operation:

This circuit converts the MODEM signals sent between the bell signals into the serial signals. The baud rate of the MODEM signals is 300 bps. This circuit is composed of one IC (IC301, IC302, IC303, IC304), and four of this circuit are installed corresponding to each CO line.

■ Serial/Parallel Converter Circuit

Composition:
 IC305, IC306, etc.

Circuit Operation:

This circuit converts the serial data presented from the MODEM signal demodulator into the parallel data for the main CPU to read them.

Four of this circuit are installed corresponding to each CO line. Two of this circuit are incorporated in one IC.

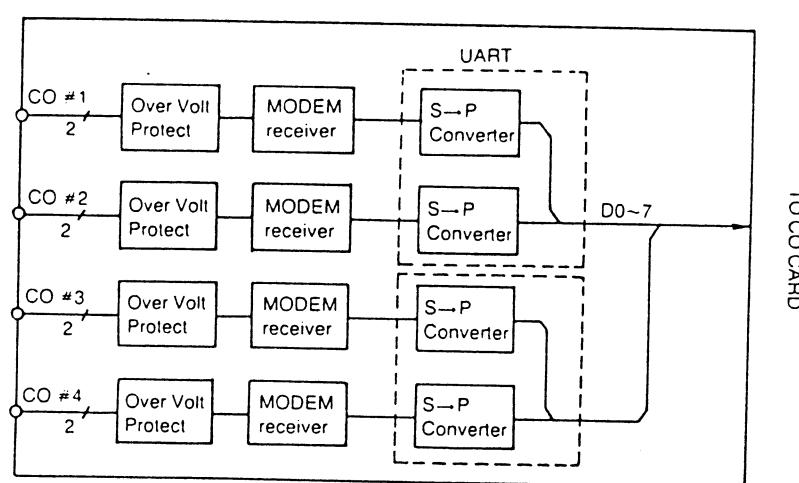
■ Over Voltage Protector Circuit

Composition:
 D301~316 etc.

Circuit Operation:

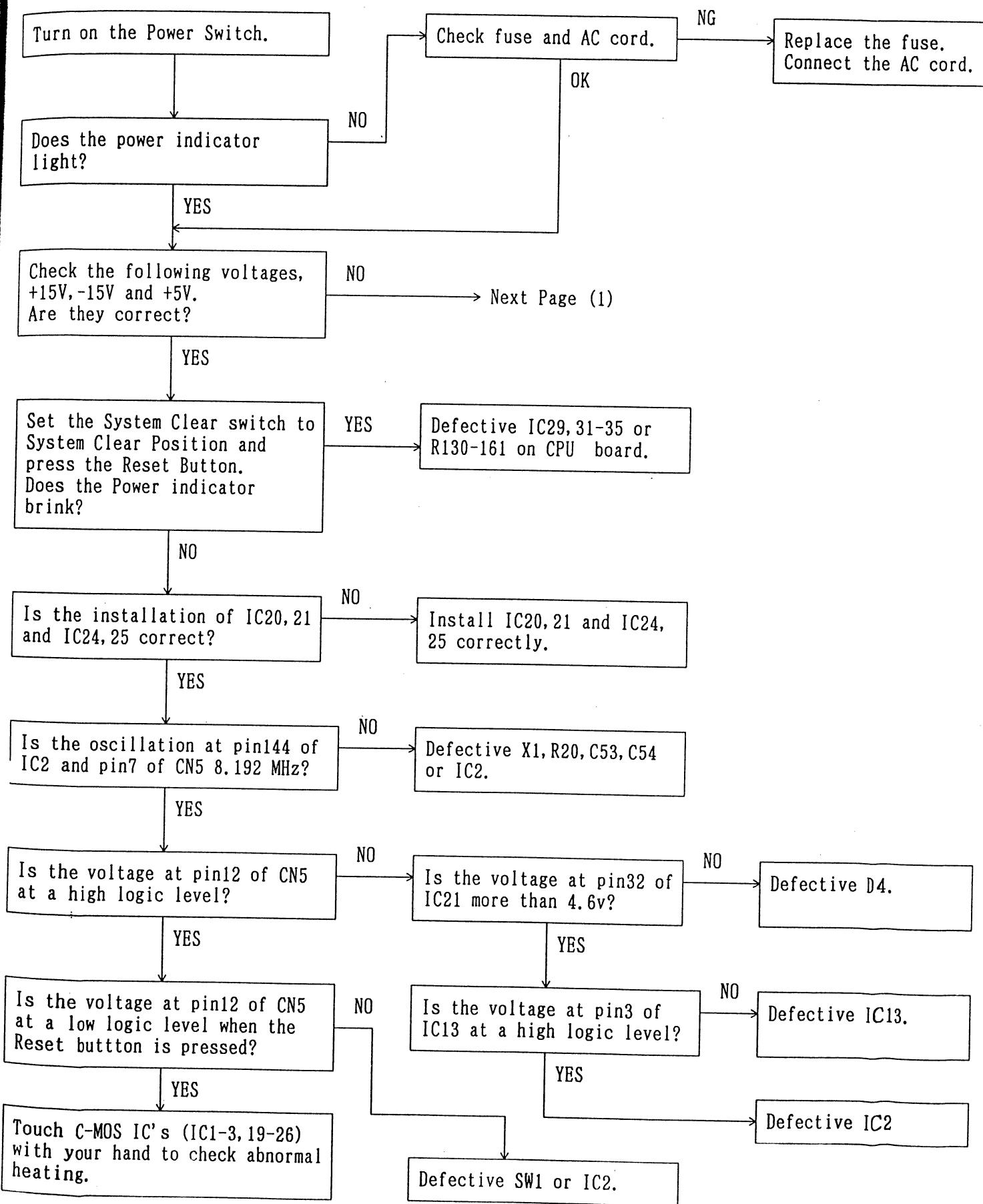
This circuit protects the MODEM receiver from the bell signal on the CO line.

CALLER ID CARD



TROUBLESHOOTING GUIDE

1. NO OPERATION (Check Power Unit, CPU Board)



(1)

Is the voltage at "-15V" correct? (more than -13.5V)

YES

NO

Check the following items.
 1. Not shorted between pins 8, 9 and pins 11, 12 of IC402.
 2. Not broken D401.
 3. Not broken PC400.
 4. Not broken the core of transformer.
 5. Not broken SA400.

OK

NG

Replace the broken parts.

Is the voltage at "+15V" correct? (+13.5V—+16.5V)

YES

NO

Is the voltage at pin 2 of IC450 correct?
 (+13.5V—+16.5V)

OK

NO

Replace IC450.

Is the voltage at "+5V" correct? (+4.5—+5.5V)

YES

NO

Check the following items.
 1. Not open F450.
 2. Correct voltage (+4.5—+5.5V) at pin 9 of IC451.

OK

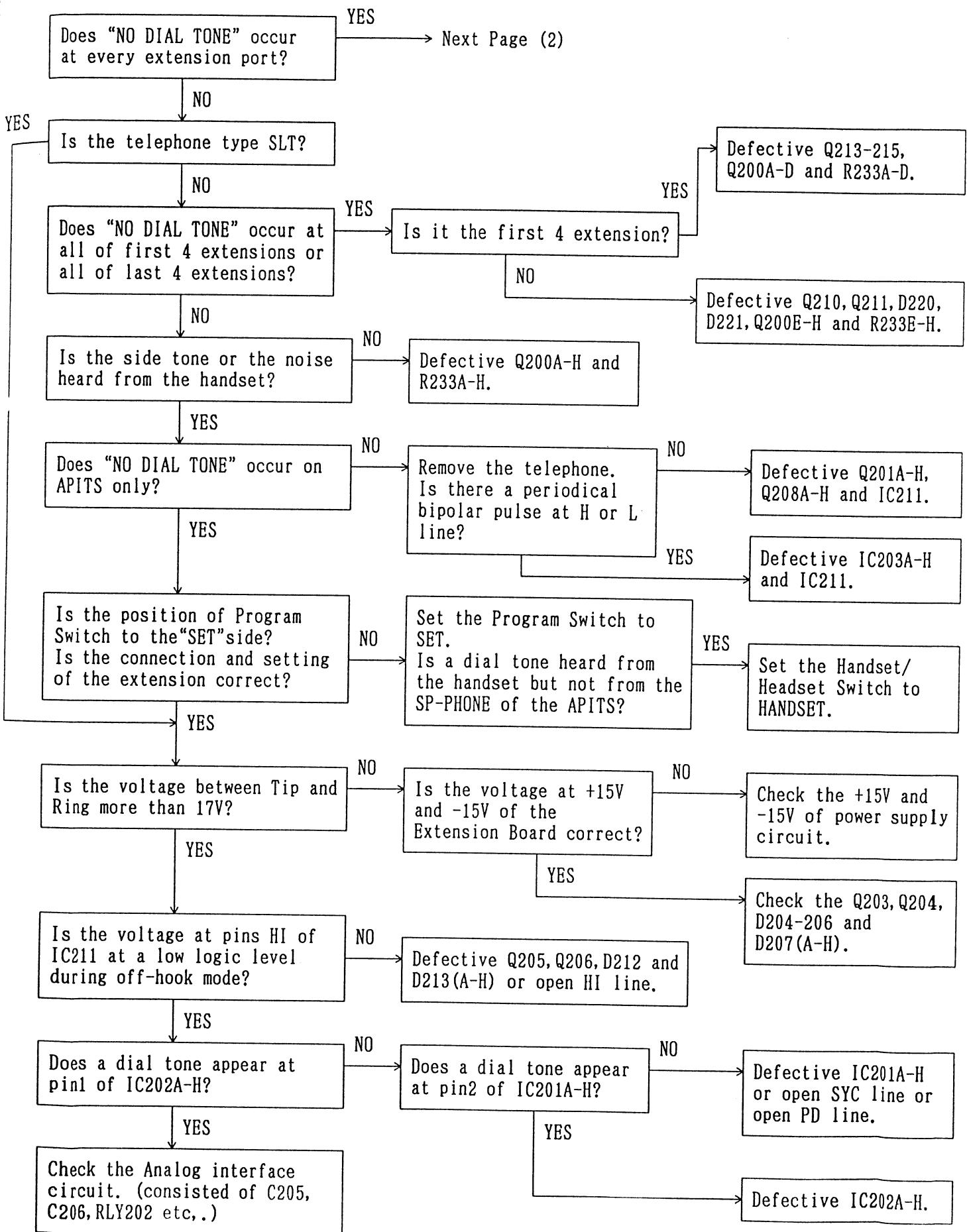
NG

Replace the broken parts.

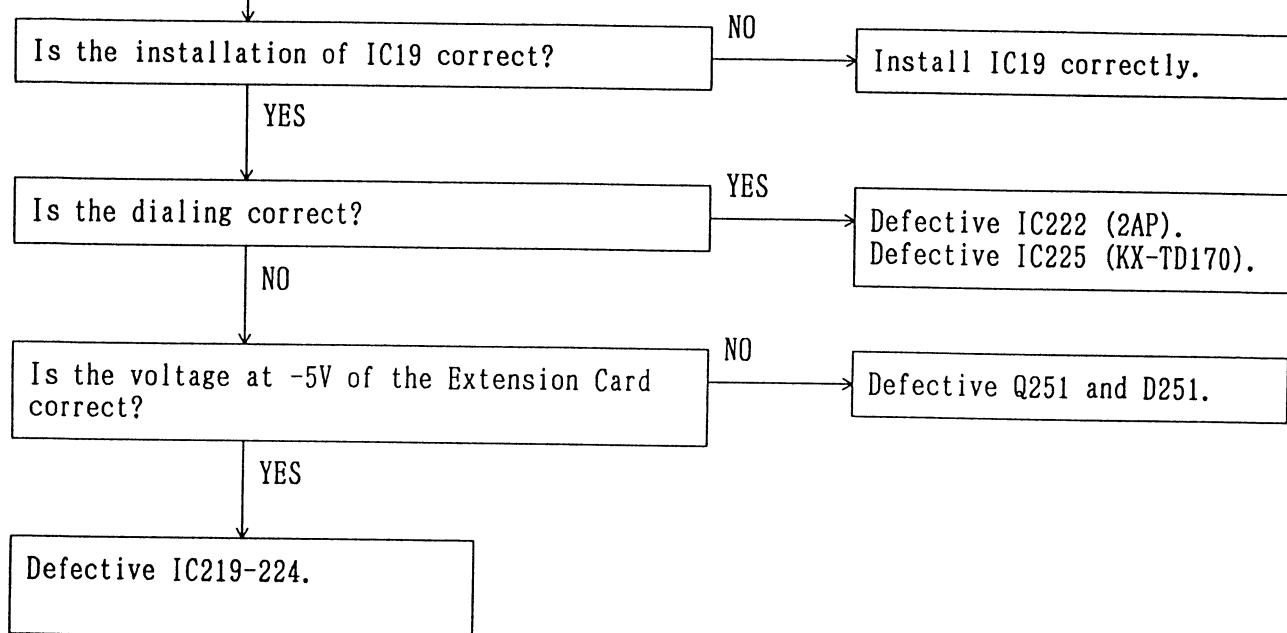
OK

There are other broken parts.
 Replace the Power Unit.

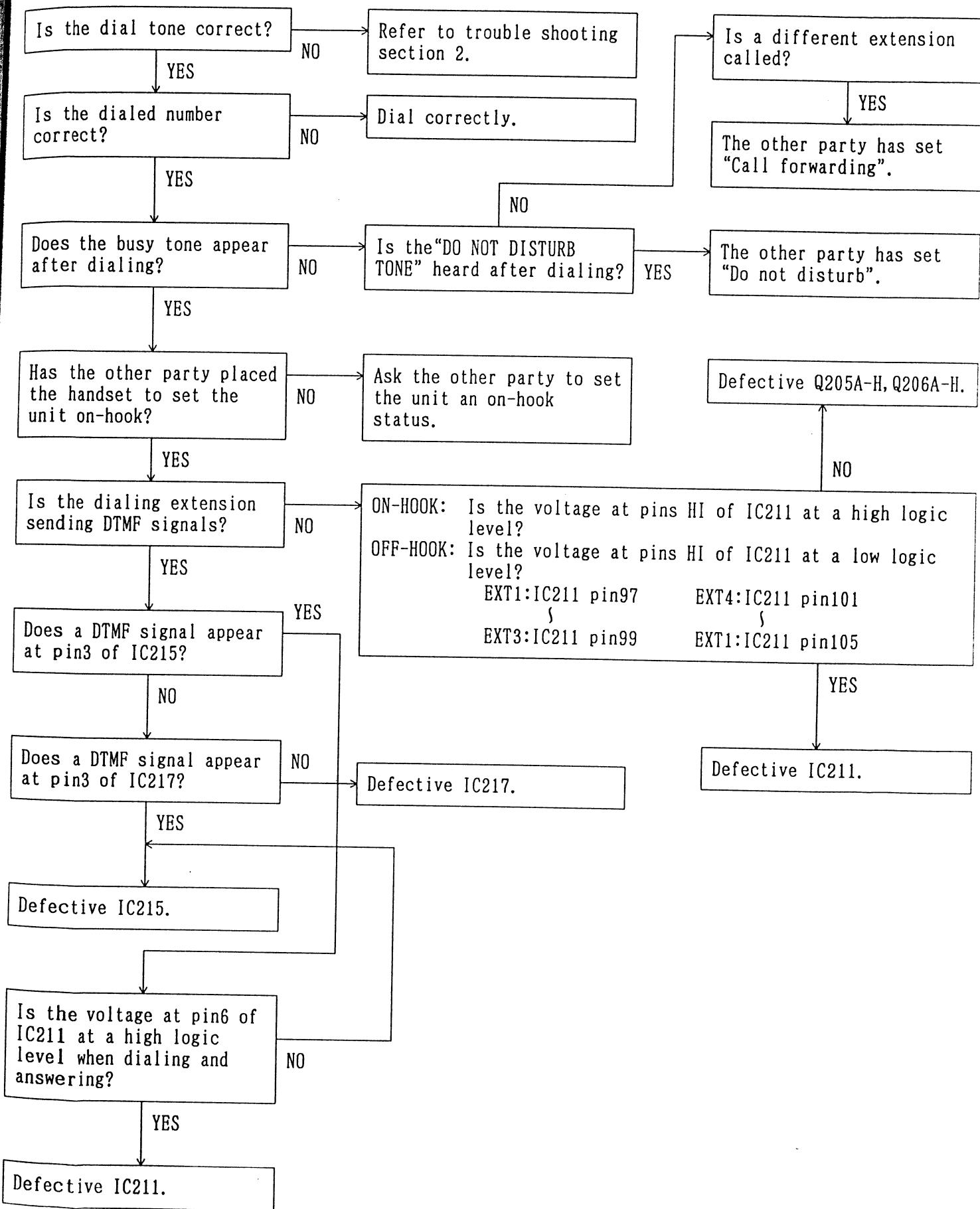
2. NO DIAL TONE (Check Extension Board)



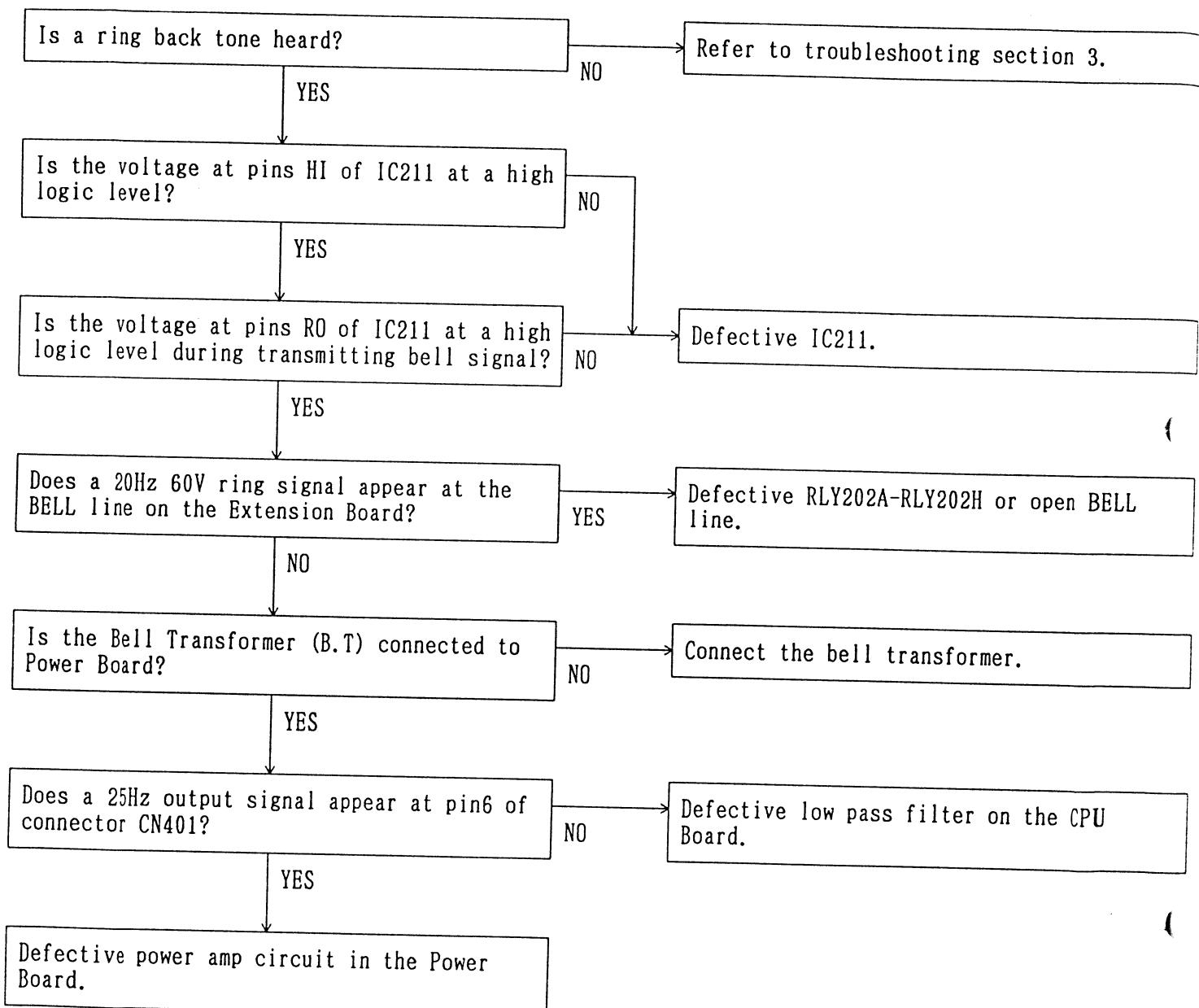
(2)



3. CAN NOT DIAL (Check Extension Board)

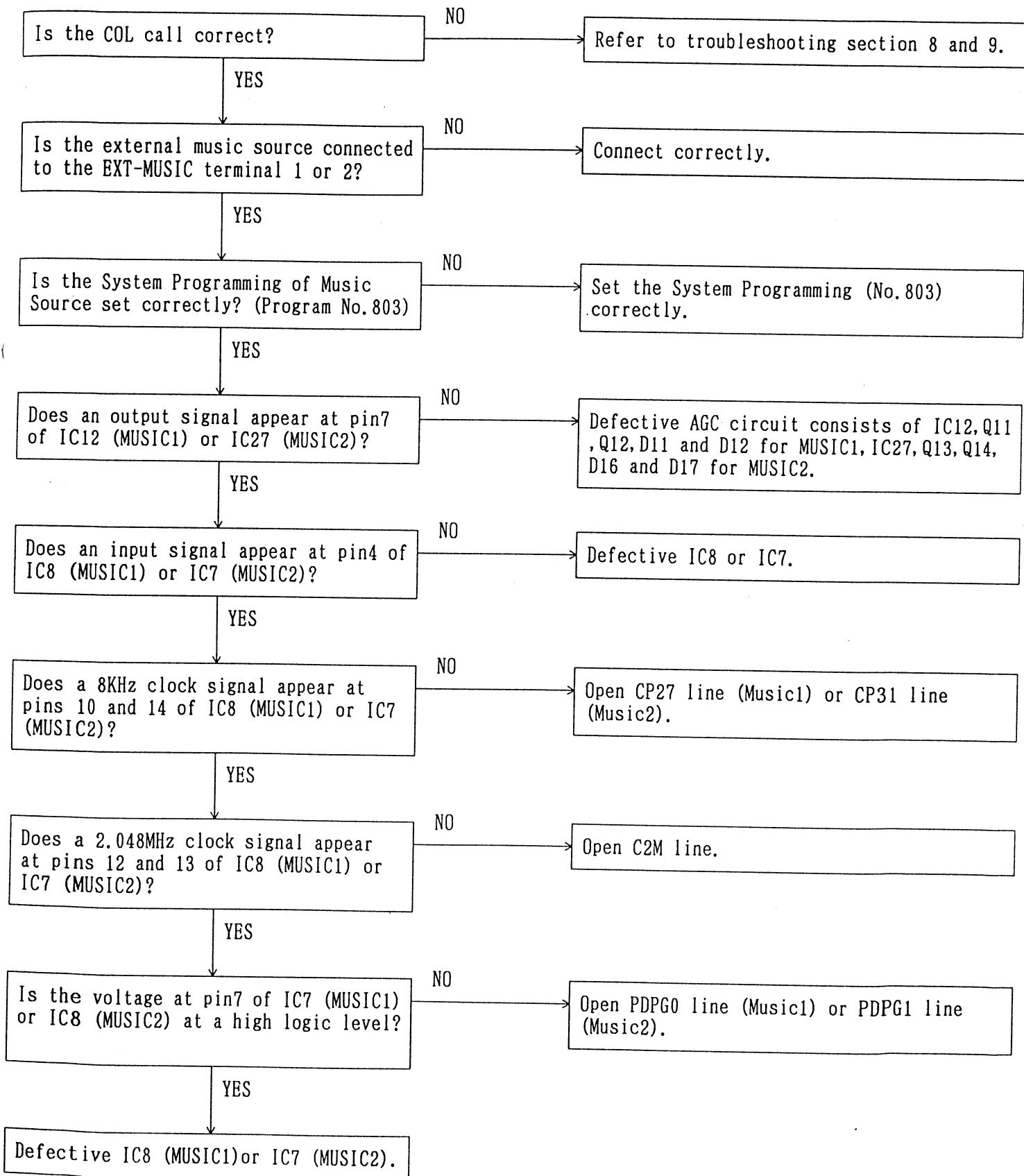


4. CAN NOT ACCESS AN EXTENSION (Check Extension Board, Power Unit and CPU Board)

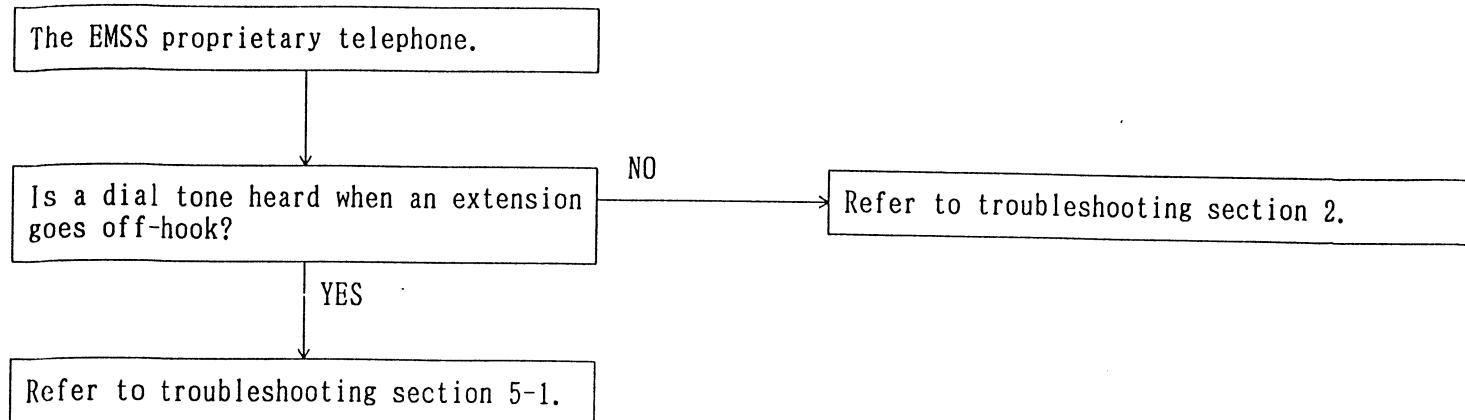


5. CAN NOT SEND A HOLD TONE (Check CPU Board)

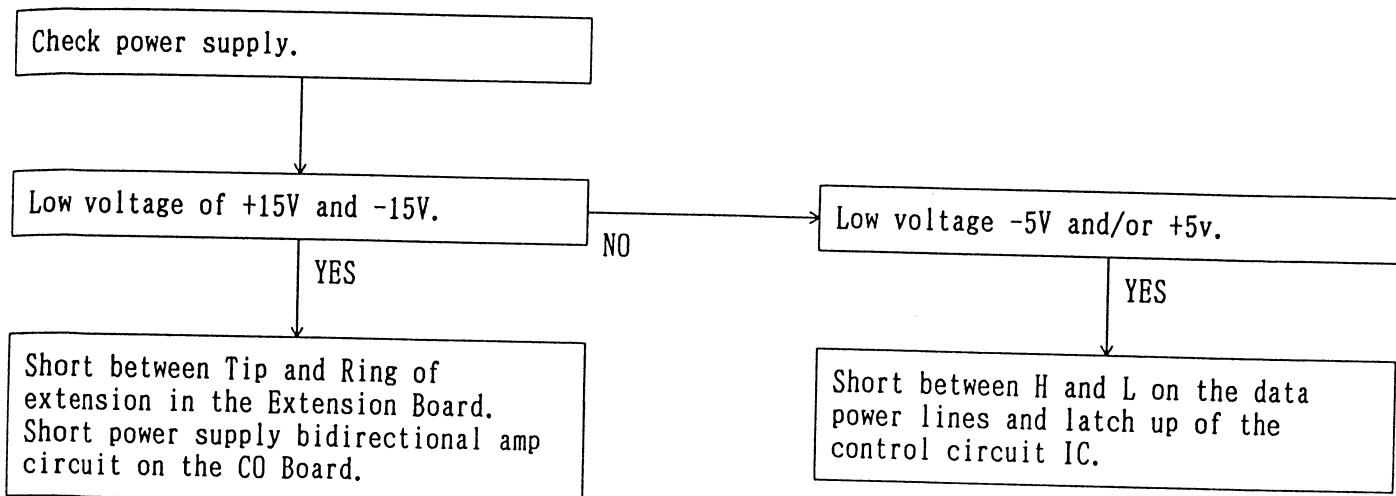
5-1 Hold Tone to COL



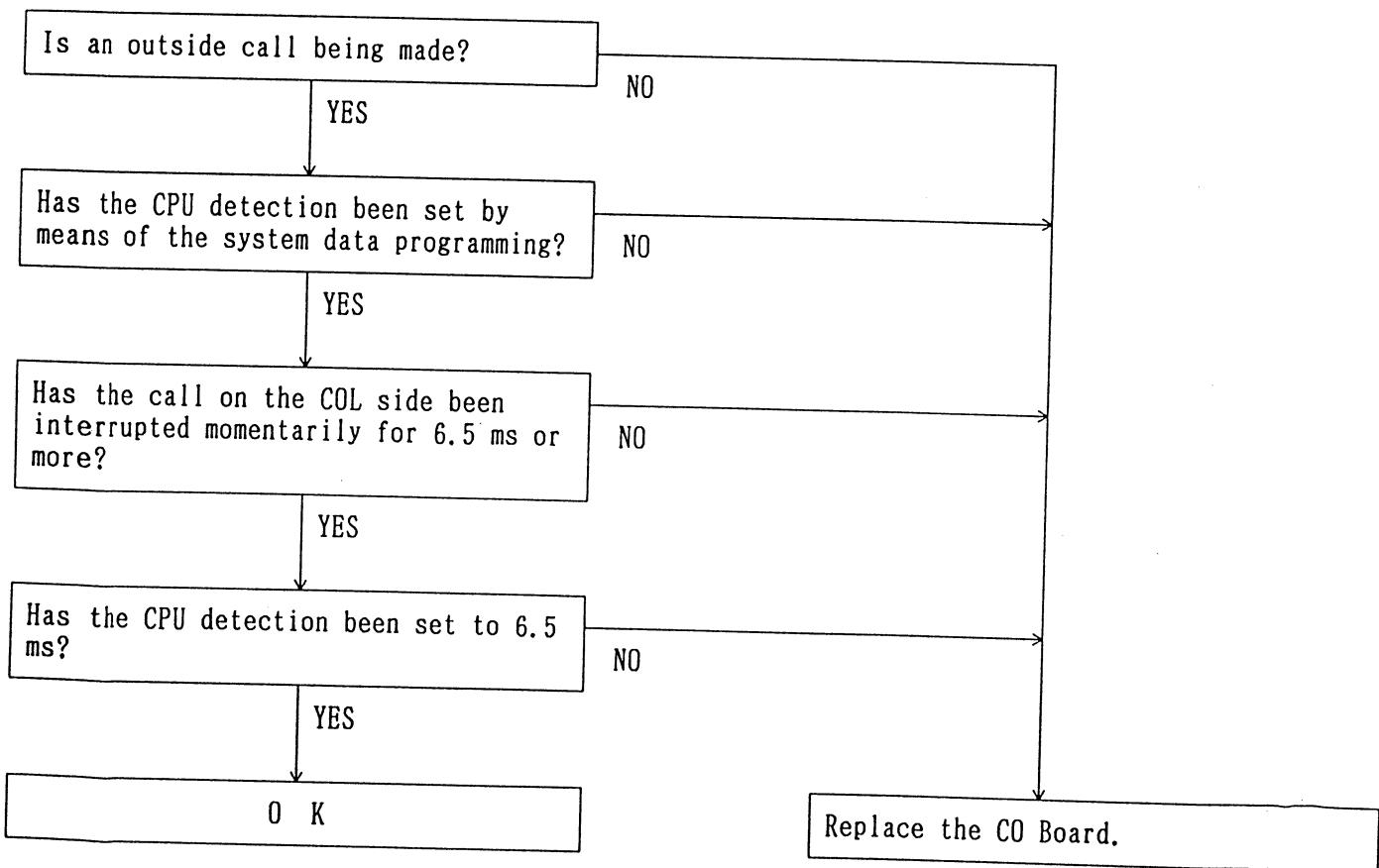
5-2 BGM (Back Ground Music)



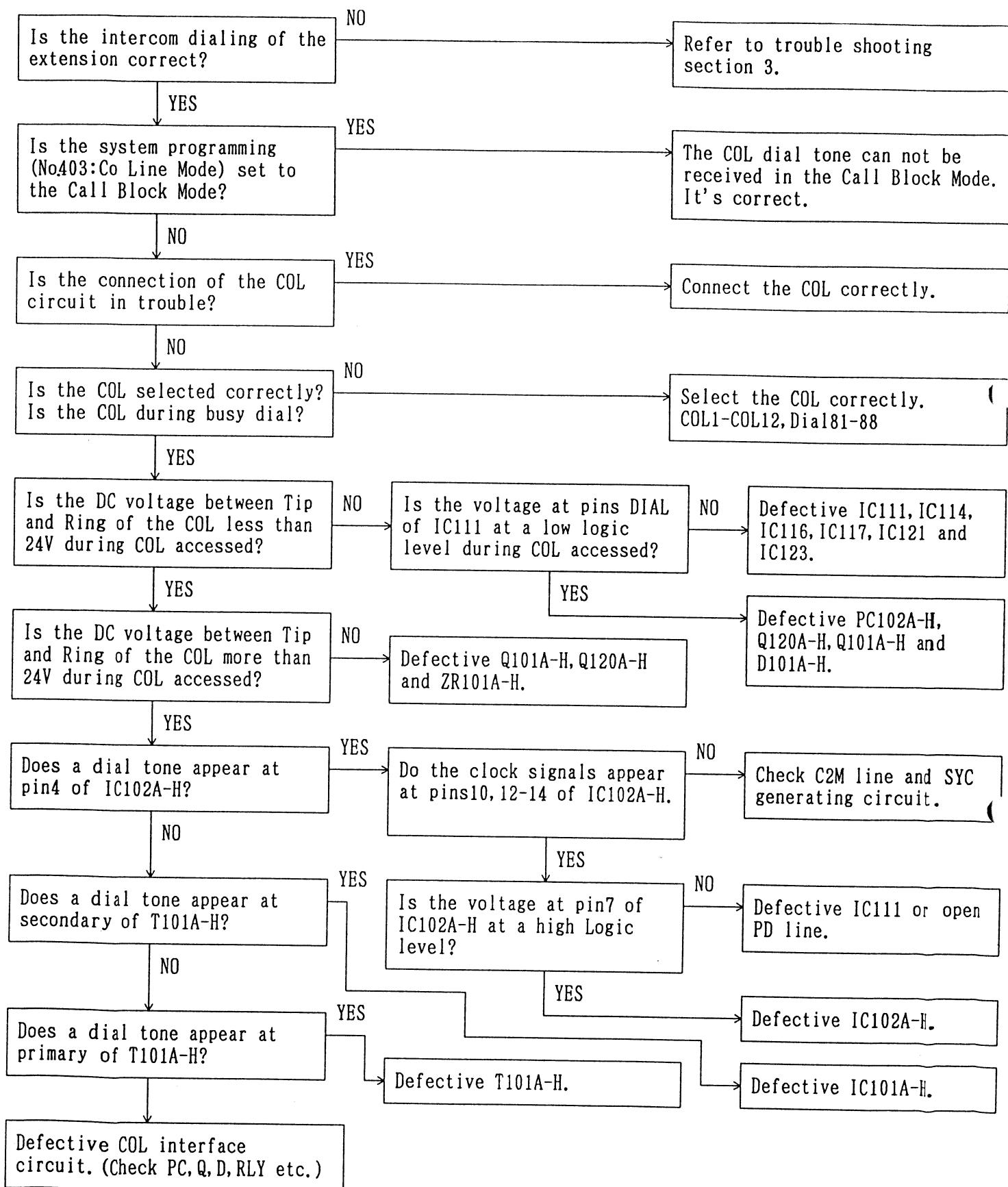
6. TOO MUCH NOISE LEVEL WITH INTERCOM (HUM)
(Check Power, Extension and CO Board)



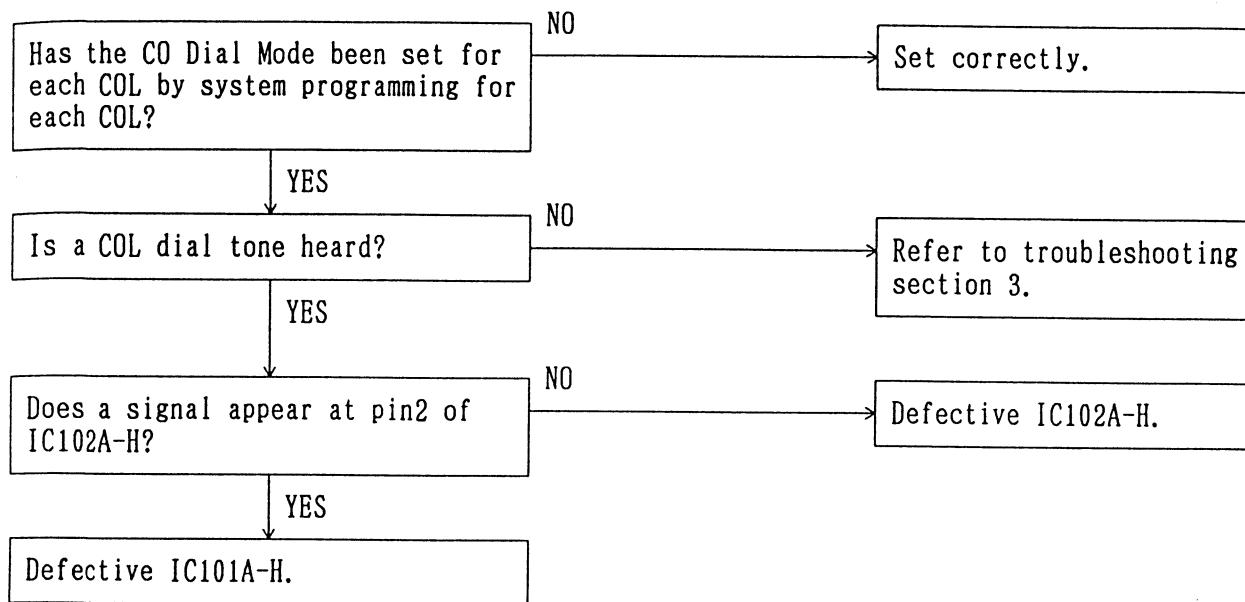
7. COL LINE'S RELEASED DURING A CALL (Check CO Board)



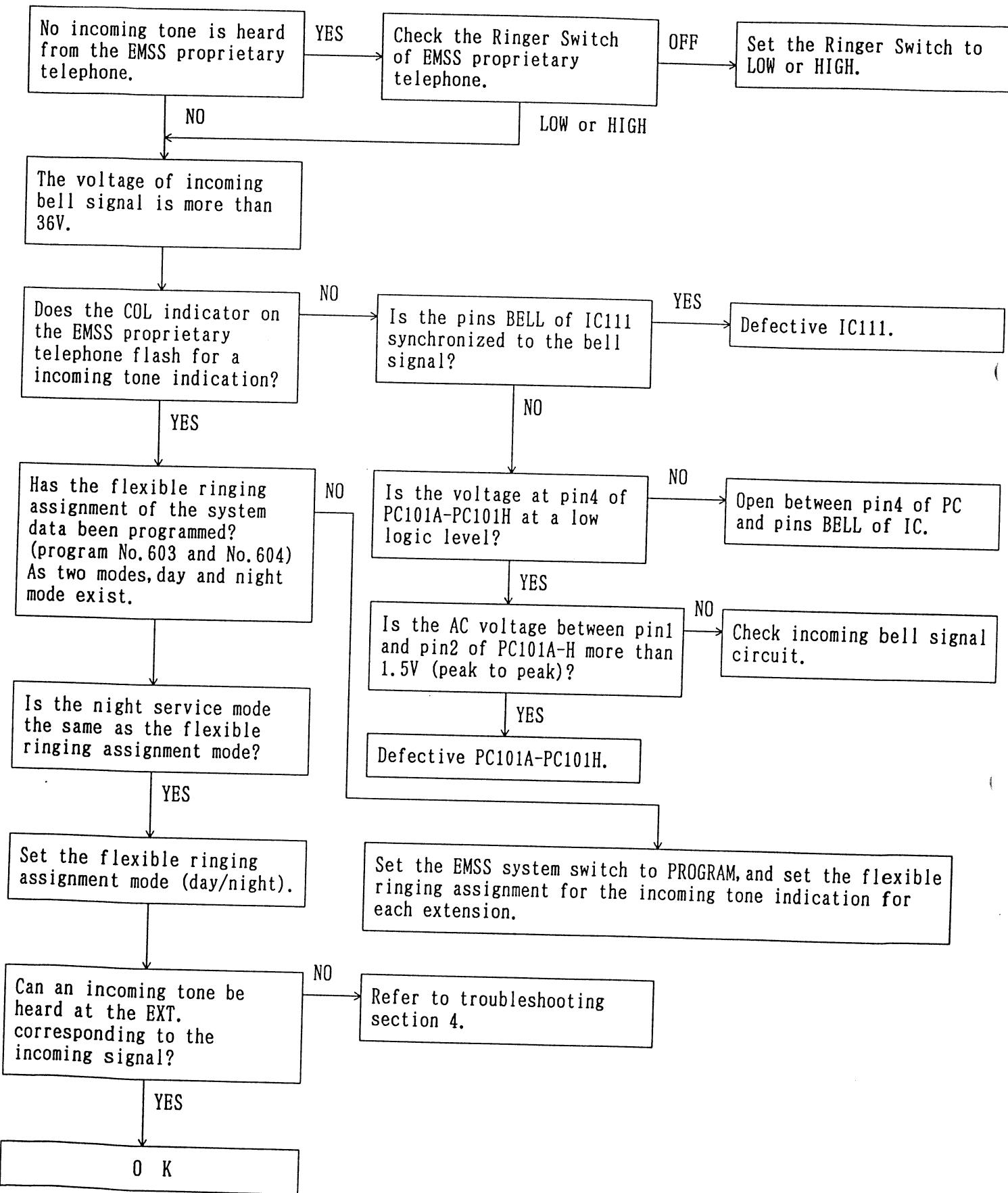
8. CAN NOT RECEIVE COL DIAL TONE (Check CU Board)



9. CAN NOT SEND DTMF TONES (Check CO Board)
(When Pulse/Tone conversion, Speed dial, One touch dial, Redial)



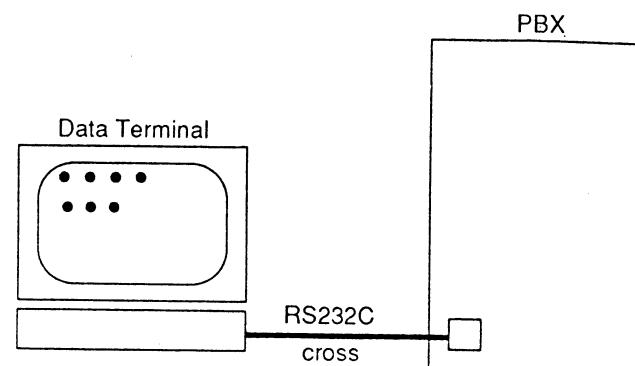
10. EXTENSION IS NOT RINGING WHILE BEING CALLED FROM A COL LINE (Check CO Board)



MEMO

DIAGNOSTIC METHOD

1. HOW TO GET INTO SELF-DIAGNOSTIC MODE



- (1) Set the main power switch to ON. (PBX and Data Terminal)
- (2) Connect the Data Terminal to the RS232C of PBX and press the return key of the Data Terminal in 10 seconds.
- (3) After message is displayed, enter password and press the return key.

Ex.) Welcome to KX-TD1232 Ver. 2.0 Panasonic CO., LTD
Enter Password
??????↓

- (4) After response message is received, enter diagnostic mode shift command "DAG".

Ex.) EIA Mode Start
DAG↓

- (5) After response message is received, diagnostic command can be used.

Ex.) DIAG Mode Start

* Setting of RS-232C communication parameter

Return Cord: CL+LF
Borate: 9600bps
Data : 8 bit
Parity Bit: None
Stop Bit: 1 bit

2. TEST ITEMS

No.	Test Items	Test Method	Check Items
1	DTMF G/R Test	1) Enter "M1 1" from the data terminal. 2) Enter "M1 2" from the data terminal.	1) Make sure response is "OK 00". 2) Make sure response is "OK 00".
2	Extension Card Test [Digital Channel Loop Back]	1) Enter "M3 1,0" from the data terminal 2) Enter "M3 2, 0" from the data terminal.	1) Make sure response is "OK 0000". 2) Make sure response is "OK 0000".
3	Extension Card Test [Digital Data Loop Back]	1) Enter "M4 1" from the data terminal. 2) Enter "M4 2" from the data terminal.	1) Make sure response is "OK 00". 2) Make sure response is "OK 00".
4	CO Line Card Test [Analogue Channel Loop Back]	1) Enter "M5 0" from the data terminal.	1) Make sure response is "OK 00".
5	CO Line Card Test [Diagnostic Relay turn]	1) Enter "M6 0" from the data terminal.	1) Make sure response is "OK 00 00 00 00 00".
6	Doorphone Card Test	1) Enter "M9" from the data terminal.	1) Make sure response is "OK 00".
7	Conference Trunk Test	1) Enter "MC" from the data terminal.	1) Make sure response is "OK 3F".

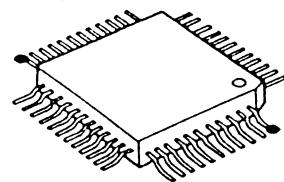
HOW TO REPLACE FLAT PACKAGE IC

■ PREPARATION

- SOLDER Sparkle Solder 115A-1, 115B-1
OR
Almit Solder KR-19, KR-19RMA
- Soldering iron Recomended power consumption will be between 30w to 40w.
Temperature of Copper Rod $662 \pm 50^{\circ}$ F ($350 \pm 10^{\circ}$ C)
(An expert may handle 60~80w iron, but beginner might damage foil by overheating)
- Flux HI115 Specific gravity 0.863
(Original flux will be replaced daily.)

■ PROCEDURE

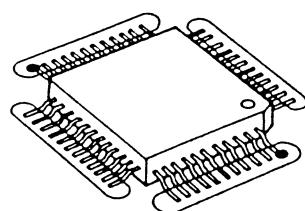
1. Temporary fix FLAT PACKAGE IC by Soldering on marked 2pins.



●Temporary soldering point.

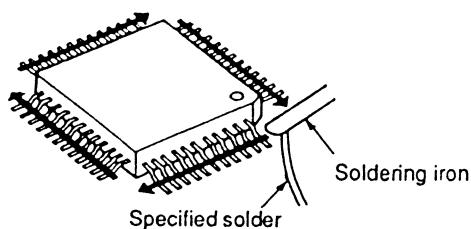
*Most important matter is accurate setting of IC to the corresponding soldering foil.

2. Apply flux for all pins of FLAT PACKAGE IC.



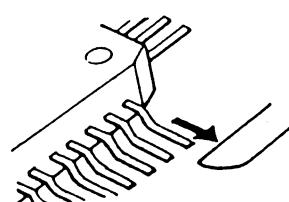
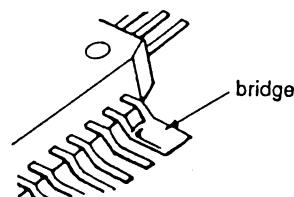
.....Flux

3. Solder employing specified solder to direction arrow, as slide the soldering iron.



■ MODIFICATION PROCEDURE OF BRIDGE

1. Re-solder slightly on bridging portion.
2. Remove remained solder along pins employing soldering iron as shown in below Figure.



EXPLANATION OF CONNECTORS

CN402

Pin	Signal Name	I/O	ACT (H/L)
1	FHNR	I	L
2	HALTN	O	L
3	INTMN	I	L
4	RXD	I	H/L
5	TXD	O	H/L
6	ECK	O	H
7	IRWN	O	H/L
8	SRSTN	O	L
9	IOWN	O	L
10	IORN	O	L
11	IOCSN	O	L
12	CHS4	O	H/L
13	CHS3	O	H/L
14	CHS2	O	H/L
15	CHS1	O	H/L
16	CHS0	O	H/L
17	GND	---	---
18	GND	---	---
19	MCLK	I	H/L
20	CPUCKN	O	H/L
21	C4M	O	H/L
22	C2MN	O	H/L
23	---	---	Not Used
24	GND	---	---
25	A12N	O	H/L
26	A11N	O	H/L
27	A10N	O	H/L
28	A9N	O	H/L
29	A6N	O	H/L
30	A5N	O	H/L
31	A4N	O	H/L
32	A3N	O	H/L
33	A2N	O	H/L
34	A1N	O	H/L
35	D7N	B	H/L
36	D6N	B	H/L
37	D5N	B	H/L
38	D4N	B	H/L
39	D3N	B	H/L
40	D2N	B	H/L

Pin	Signal Name	I/O	ACT (H/L)
41	D1N	B	H/L
42	D0N	B	H/L
43	HWR7	I	H/L
44	HWS7	O	H/L
45	HWR6	I	H/L
46	HWS6	O	H/L
47	HWR5	I	H/L
48	HWS5	O	H/L
49	HWR4	I	H/L
50	HWS4	O	H/L
51	HWR3	I	H/L
52	HWS3	O	H/L
53	HWR2	I	H/L
54	HWS2	O	H/L
55	HWR1	I	H/L
56	HWS1	O	H/L
57	GND	---	---
58	OHCAR	---	---
59	5	---	---
60	OHCAT	---	---
61	-15	---	---
62	GND	---	---
63	15	---	---
64	BELLS	O	---

CN401

Pin	Signal Name	I/O	ACT (H/L)
1	+15V	---	---
2	-15V	---	---
3	+5V	---	---
4	GND	---	---
5	GND	---	---
6	BELLS	---	---
7	BELL	---	---

CN9

Pin	Signal Name	I/O	ACT (H/L)
1	C2M	O	H/L
2	MU/A	O	H/L
3	HWS0	O	H/L
4	HWR0	I	H/L
5	CP29	O	H
6	CP30	O	H
7	D0	B	H/L
8	D1	B	H/L
9	D2	B	H/L
10	D3	B	H/L
11	D4	B	H/L
12	D5	B	H/L
13	GND	---	---
14	PIGN	O	L
15	POGN	O	L
16	+15V	---	---
17	-15V	---	---
18	5	---	---
19	-5	---	---
20	FG	---	---

CN411

Pin	Signal Name	I/O	ACT (H/L)
1	GND	---	---
2	GND	---	---
3	FHNR	O	L
4	ECK	I	H
5	SRSTN	I	L
6	IOWN	I	L
7	IRWN	I	H/L
8	IOCSN	I	L
9	CHS4	I	H/L
10	CHS3	I	H/L
11	CHS2	I	H/L
12	CHS1	I	H/L
13	CHS0	I	H/L
14	GND	---	---
15	MCLK	O	H/L
16	CPUCKN	I	H/L
17	C4M	I	H/L
18	C2MN	I	H/L
19	GND	---	---
20	A5N	I	H/L
21	A12N	I	H/L
22	A11N	I	H/L
23	A10N	I	H/L
24	A9N	I	H/L
25	A4N	I	H/L
26	A3N	I	H/L
27	A2N	I	H/L
28	A1N	I	H/L
29	D7N	B	H/L
30	D6N	B	H/L
31	D5N	B	H/L
32	D4N	B	H/L
33	D3N	B	H/L
34	D2N	B	H/L
35	D1N	B	H/L
36	D0N	B	H/L
37	HWR7	O	H/L
38	HWS7	I	H/L
39	GND	---	---
40	+5V	---	---

CN11

Pin	Signal Name	I/O	ACT (H/L)
1	SD	O	12
2	RD	I	12
3	ER	O	12
4	DR	I	12
5	SG	---	---
6	FG	---	---

CN4

Pin	Signal Name	I/O	ACT (H/L)
1	LED1	---	---
2	LED2	O	L

CN410

Pin	Signal Name	I/O	ACT (H/L)
1	INTMN	O	L
2	RXD	O	H/L
3	TXD	I	H/L
4	SRSTN	I	L
5	IOW	I	L
6	IORN	I	L
7	IOCSN	I	L
8	CHS4	I	H/L
9	CHS3	I	H/L
10	CHS2	I	H/L
11	CHS1	I	H/L
12	CHS0	I	H/L
13	A2N	I	H/L
14	C2MN	I	H/L
15	A12N	I	H/L
16	A11N	I	H/L
17	A10N	I	H/L
18	A9N	I	H/L
19	A1N	I	H/L
20	D7N	B	H/L
21	D6N	B	H/L
22	D5N	B	H/L
23	D4N	B	H/L
24	D3N	B	H/L
25	D2N	B	H/L
26	D1N	B	H/L
27	D0N	B	H/L
28	HWR6	O	H/L
29	HWS6	I	H/L
30	GND	---	---
31	5	---	---
32	GND	---	---
33	-15V	---	---
34	+15V	---	---

Pin	Signal Name	I/O	ACT (H/L)
6	SRSTN	I	L
7	IOWN	I	L
8	IORN	I	L
9	IOCSN	I	L
10	CHS4	I	H/L
11	CHS3	I	H/L
12	CHS2	I	H/L
13	CHS1	I	H/L
14	CHS0	I	H/L
15	GND	---	---
16	GND	---	---
17	CPUCKN	I	H/L
18	C4M	I	H/L
19	C2MN	I	H/L
20	GND	---	---
21	---	---	Not Used
22	---	---	Not Used
23	AN12N	I	H/L
24	AN11N	I	H/L
25	AN10N	I	H/L
26	A9N	I	H/L
27	A6N	I	H/L
28	A5N	I	H/L
29	A4N	I	H/L
30	A3N	I	H/L
31	A2N	I	H/L
32	A1N	I	H/L
33	D7N	B	H/L
34	D6N	B	H/L
35	D5N	B	H/L
36	D4N	B	H/L
37	D3N	B	H/L
38	D2N	B	H/L
39	D1N	B	H/L
40	D0N	B	H/L
41	HWR6	O	H/L
42	HWS6	I	H/L
43	GND	---	---
44	GND	---	---
45	+5V	---	---
46	+5V	---	---
47	-15V	---	---
48	-15V	---	---
49	+15V	---	---
50	+15V	---	---

CN409

Pin	Signal Name	I/O	ACT (H/L)
1	GND	---	---
2	GND	---	---
3	GND	---	---
4	GND	---	---
5	HALTN	I	L

CN405

Pin	Signal Name	I/O	ACT (H/L)
1	+15V	---	---
2	-15V	---	---
3	+5V	---	---
4	GND	---	
5	IOCSN	I	L
6	SRSTN	I	L
7	CHS4	I	H/L
8	CHS3	I	H/L
9	CHS2	I	H/L
10	CHS1	I	H/L
11	CHS0	I	H/L
12	IOWN	I	L
13	IORN	I	L
14	C2MN	I	H/L
15	GND	---	---
16	A12N	I	H/L
17	A11N	I	H/L
18	A10N	I	H/L
19	A9N	I	H/L
20	A6N	I	H/L
21	A5N	I	H/L
22	A4N	I	H/L
23	A3N	I	H/L
24	A2N	I	H/L
25	A1N	I	H/L

Pin	Signal Name	I/O	ACT (H/L)
26	D7N	B	H/L
27	D6N	B	H/L
28	D5N	B	H/L
29	D4N	B	H/L
30	D3N	B	H/L
31	D2N	B	H/L
32	D1N	B	H/L
33	D0N	B	H/L
34	HWR1	O	H/L
35	HWS1	I	H/L
36	GND	---	---
37	GND	---	---
38	R4	---	---
39	GND	---	---
40	T4	---	---
41	GND	---	---
42	R3	---	---
43	GND	---	---
44	T3	---	---
45	RING	---	---
46	R2	---	---
47	TIP	---	---
48	T2	---	---
49	T1	---	---
50	R1	---	---

CN406/407/408

Pin	Signal Name	I/O	ACT (H/L)
1	GND	---	---
2	GND	---	---
3	FHNR	O	L
4	HALTN	I	L
5	ECK	I	H
6	IRWN	I	L
7	SRSTN	I	L
8	IOWN	I	L
9	IORN	I	L
10	IOCSN	I	L
11	CHS4	I	H/L
12	CHS3	I	H/L
13	CHS2	I	H/L
14	CHS1	I	H/L
15	CHS0	I	H/L
16	GND	---	---
17	MCLK	O	H/L
18	CPUCKN	I	H/L
19	C4M	I	H/L
20	C2MN	I	H/L
21	GND	---	---
22	GND	---	---
23	A12N	I	H/L
24	A11N	I	H/L
25	A10N	I	H/L
26	A9N	I	H/L
27	A6N	I	H/L
28	A5N	I	H/L
29	A4N	I	H/L
30	A3N	I	H/L

Pin	Signal Name	I/O	ACT (H/L)
31	A2N	I	H/L
32	A1N	I	H/L
33	D7N	B	H/L
34	D6N	B	H/L
35	D5N	B	H/L
36	D4N	B	H/L
37	D3N	B	H/L
38	D2N	B	H/L
39	D1N	B	H/L
40	D0N	B	H/L
41	HWR6	O	H/L
42	HWS6	I	H/L
43	HWR5	O	H/L
44	HWS5	I	H/L
45	HWR4	O	H/L
46	HWS4	I	H/L
47	TIP	---	---
48	RING	---	---
49	---	---	Not Used
50	GND	---	---
51	GND	---	---
52	CA0	I	H/L
53	CA1	I	H/L
54	OHCAR	---	---
55	+5V	---	---
56	OHCAT	---	---
57	-15V	---	---
58	GND	---	---
59	+15V	---	---
60	BELL	I	---

CN403/404

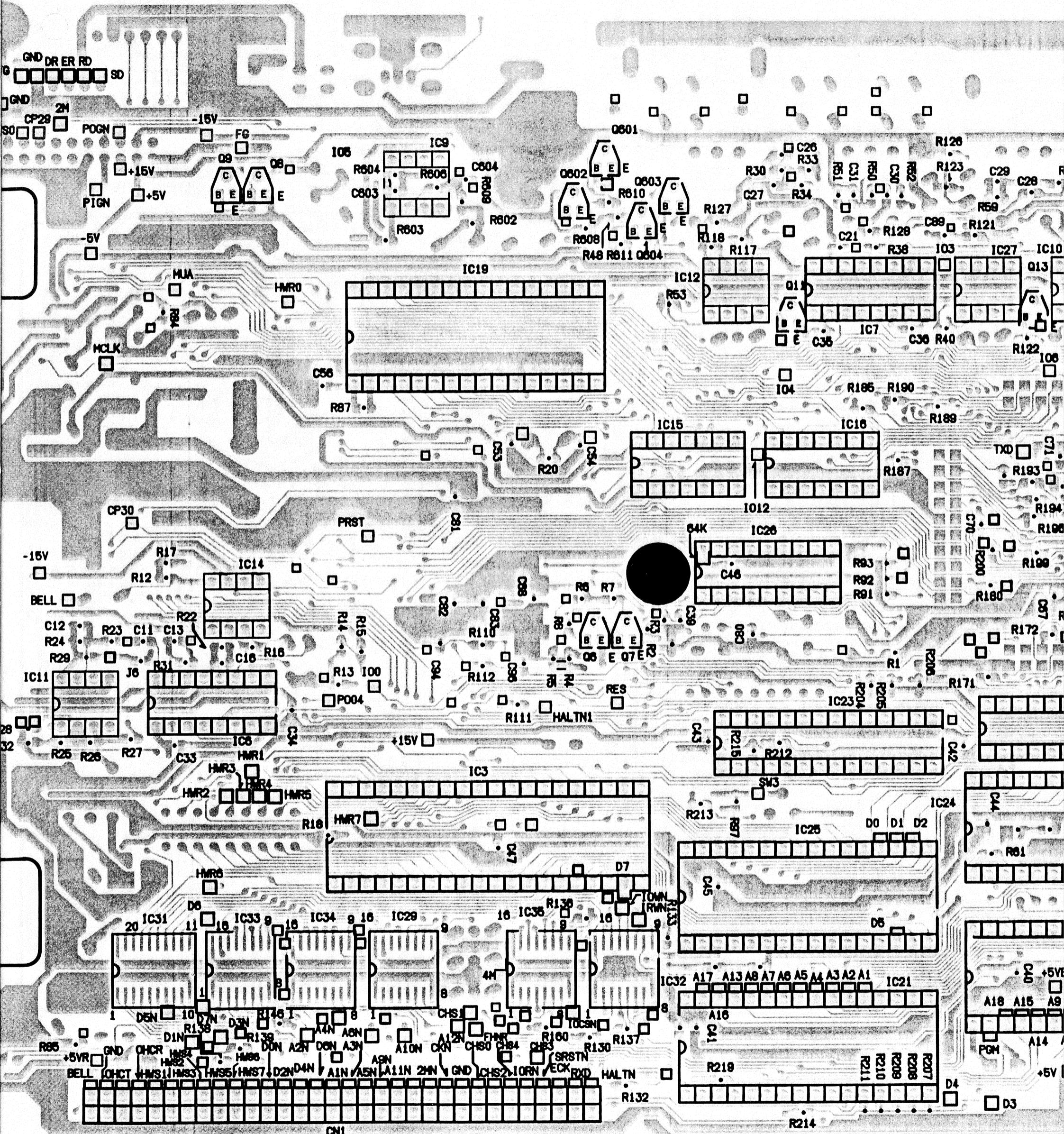
Pin	Signal Name	I/O	ACT (H/L)
1	ECK	I	H
2	IRWN	I	L
3	SRSTN	I	L
4	IOWN	I	L
5	IORN	I	L
6	IOCSN	I	L
7	CHS4	I	H/L
8	CHS3	I	H/L
9	CHS2	I	H/L
10	CHS1	I	H/L
11	CHS0	I	H/L
12	CPUCKN	I	H/L
13	C4M	I	H/L
14	C2MN	I	H/L
15	GND	---	---
16	GND	---	---
17	A12N	I	H/L
18	A11N	I	H/L
19	A10N	I	H/L
20	A9N	I	H/L
21	A6N	I	H/L
22	A5N	I	H/L
23	A4N	I	H/L
24	A3N	I	H/L
25	A2N	I	H/L

Pin	Signal Name	I/O	ACT (H/L)
26	A1N	I	H/L
27	D7N	B	H/L
28	D6N	B	H/L
29	D5N	B	H/L
30	D4N	B	H/L
31	D3N	B	H/L
32	D2N	B	H/L
33	D1N	B	H/L
34	D0N	B	H/L
35	HWR2/HWR3	O	H/L
36	HWS2/HWS.	I	H/L
37	RING	---	---
38	TIP	---	---
39	R2/R4	---	---
40	T2/T4	---	---
41	R1/R3	---	---
42	T1/T3	---	---
43	CA0	I	H/L
44	OHCAR	---	---
45	+5V	---	---
46	OHCAT	---	---
47	-15V	---	---
48	GND	---	---
49	+15V	---	---
50	BELL	---	---

PRINTED CIRCUIT BOARD (CPU BOARD)

6 | 7 | 8 | 9 | 10 | 11 | 12

(BOTTOM VIEW)



13

14

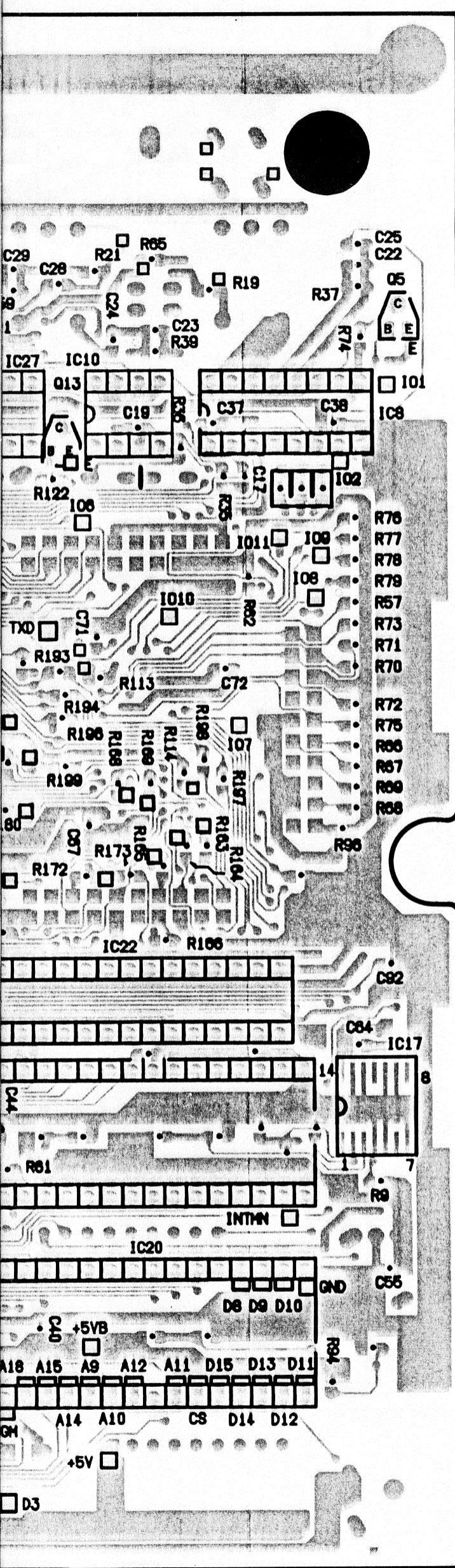
15

16

17

18

19



1

2

3

4

5

6

A

B

C

D

E

F

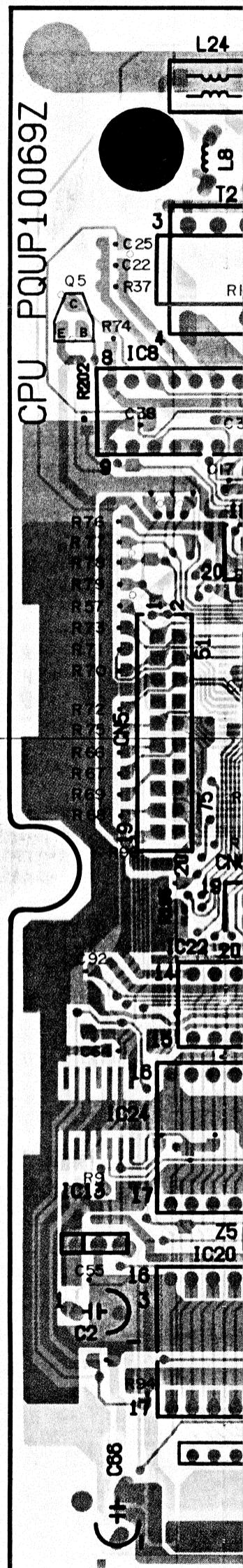
G

H

IC1

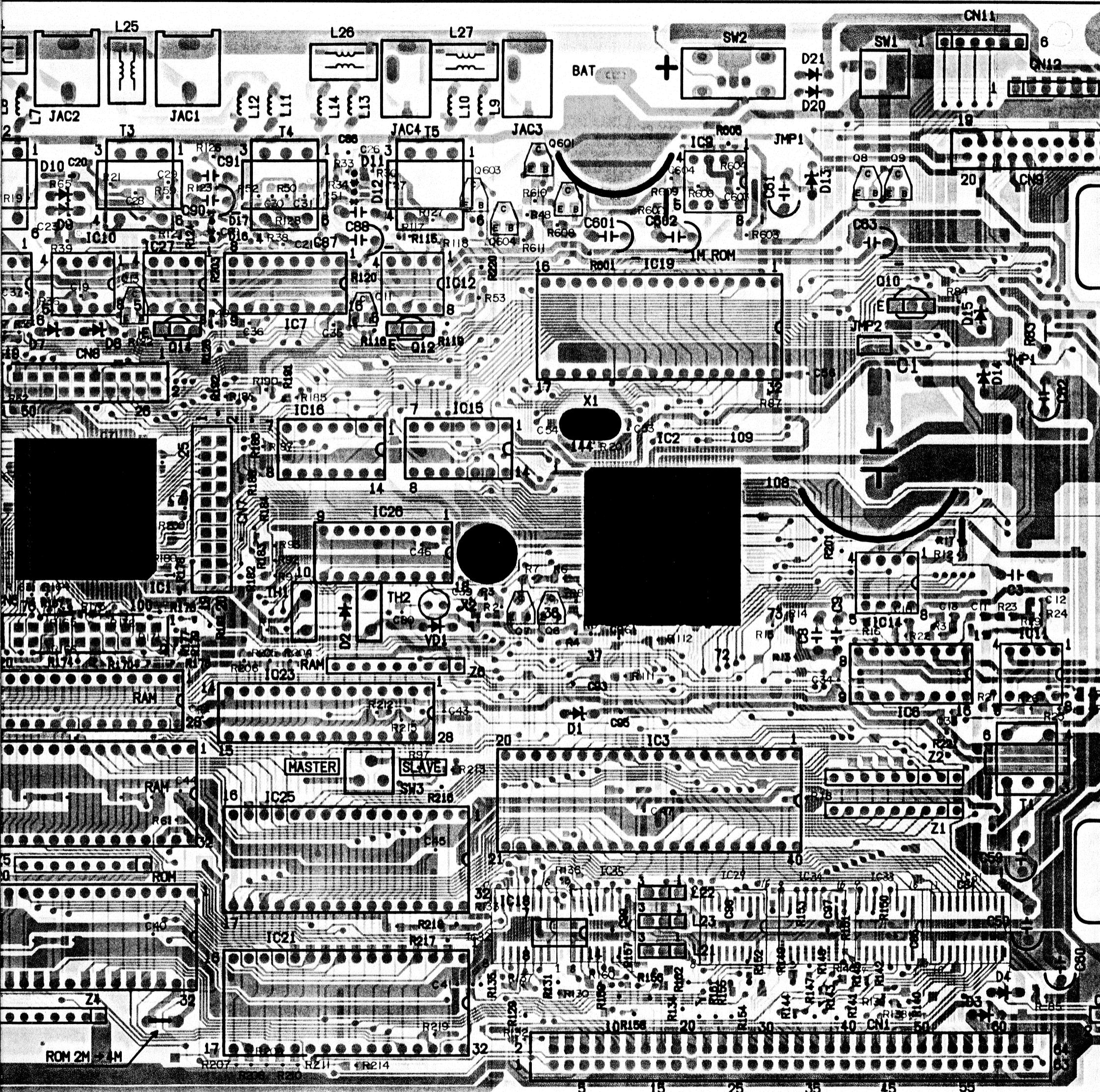
Pin No.	Voltage & Waveform
26-28	5
29	0
30-35	5
36	0
37-43	5
44	0
45, 46	5
47	0
48-50	5
51, 52	0
56, 57	5
58	5 0
59, 60	waveform 5 0
61	5
62	0
63, 64	waveform 5 0
65	waveform 5 0
68-71	5
72	waveform 5 0
73-75	5
77	waveform 5 0
78	5
79-81	waveform 5 0

Value is V.

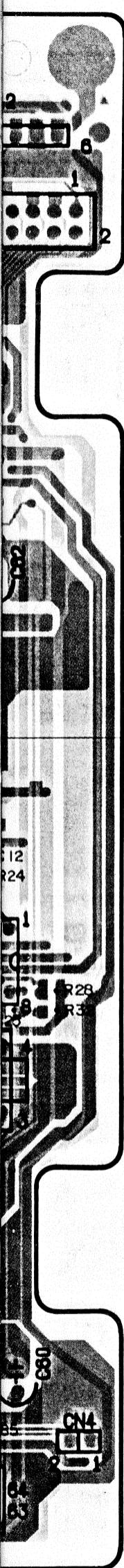


PRINTED CIRCUIT BOARD (CPU BOARD)

(COMPONENT VIEW)



the P.C.B. for CANADA.

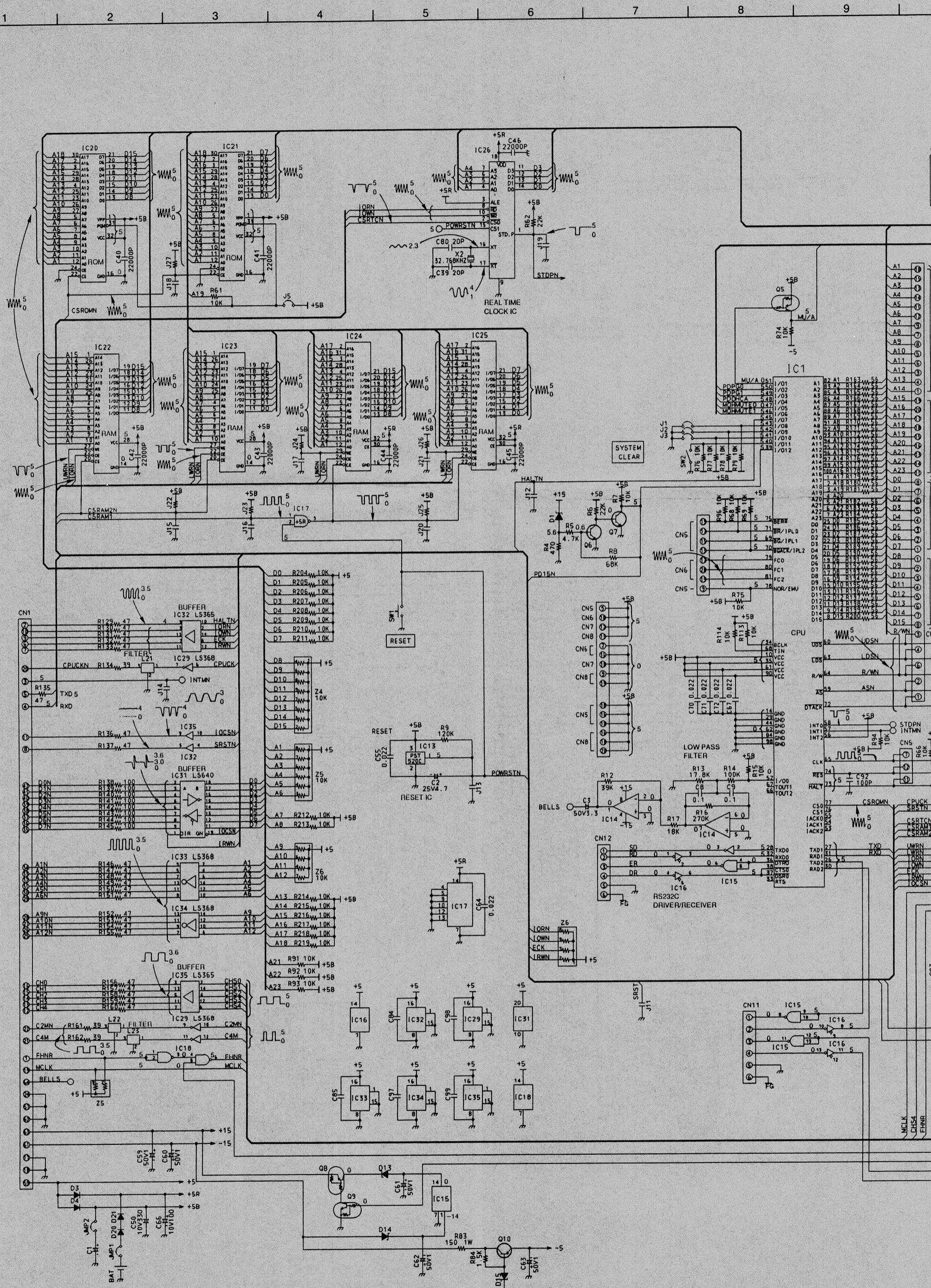


IC2

Pin No.	Voltage & Waveform
1	5
2	0
9	0
18	5
20, 21	0
30	0
41-44	5 0
45	0
46	5 0
47, 48	5 0
54	5
62-65	5 0
66	0
67-72	5 0
80, 81	0
90	5
102	0
103-110	5 0
116	5
117	0
118	5
126	0
128-130	5
137	5 0
138	0

Notes:

1. The circuit shown in [] on the conductor indicates printed circuit on the back side of the printed circuit board.
2. The circuit shown in [] on the conductor indicates printed circuit on the front side of the printed circuit board.
3. This printed circuit board may be modified at any time with the development of new technology.



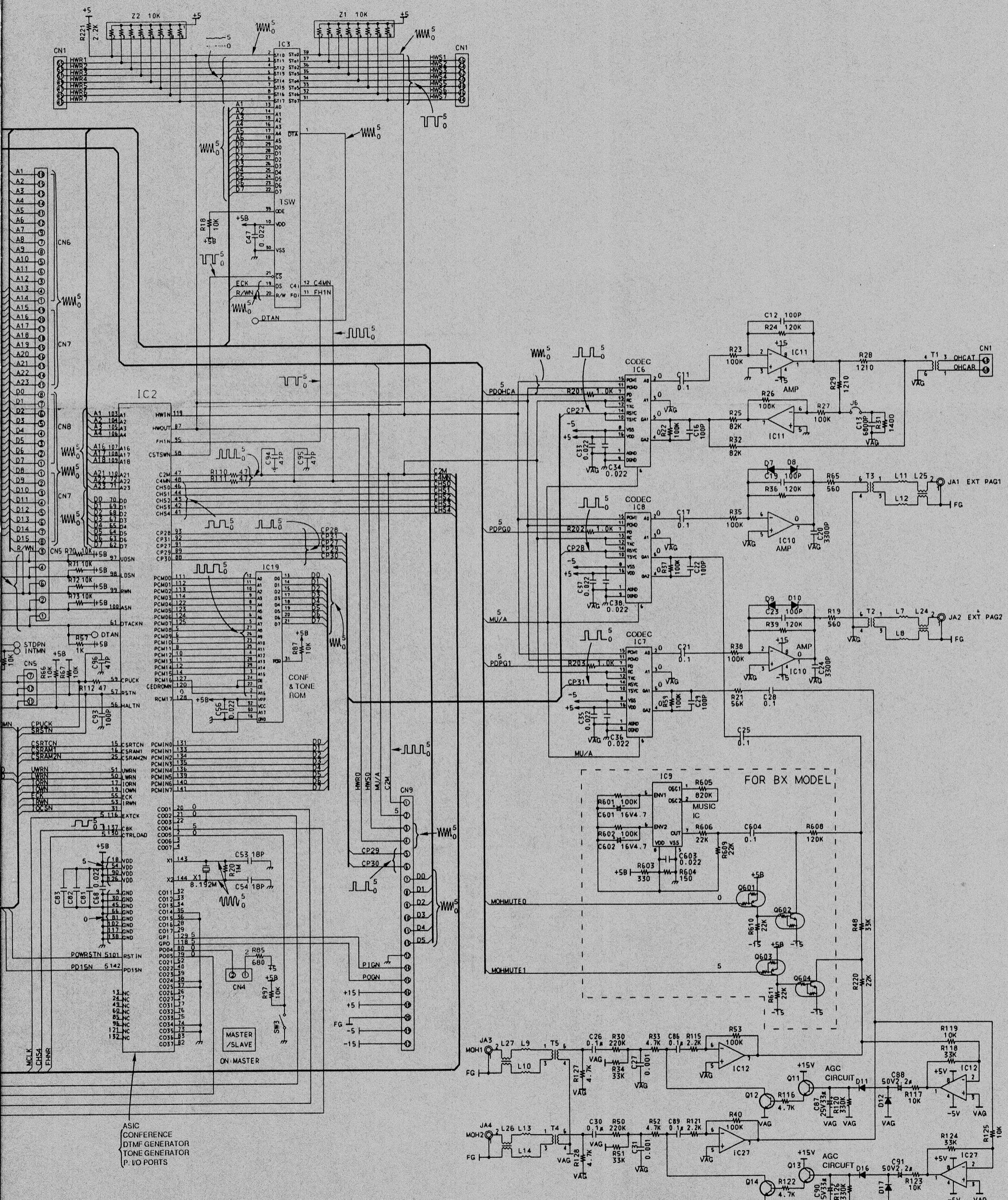
Note:

Note:

1. DC voltage measurements are taken with oscilloscope from ground line.
(Waiting condition. Value is V.)
2. The schematic diagram may be modified at any time with development of new technology.

DIAGRAM (CPU CIRCUIT)

10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19

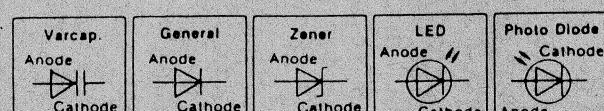


scope from ground

3. Important safety notice

Components identified by Δ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

4.



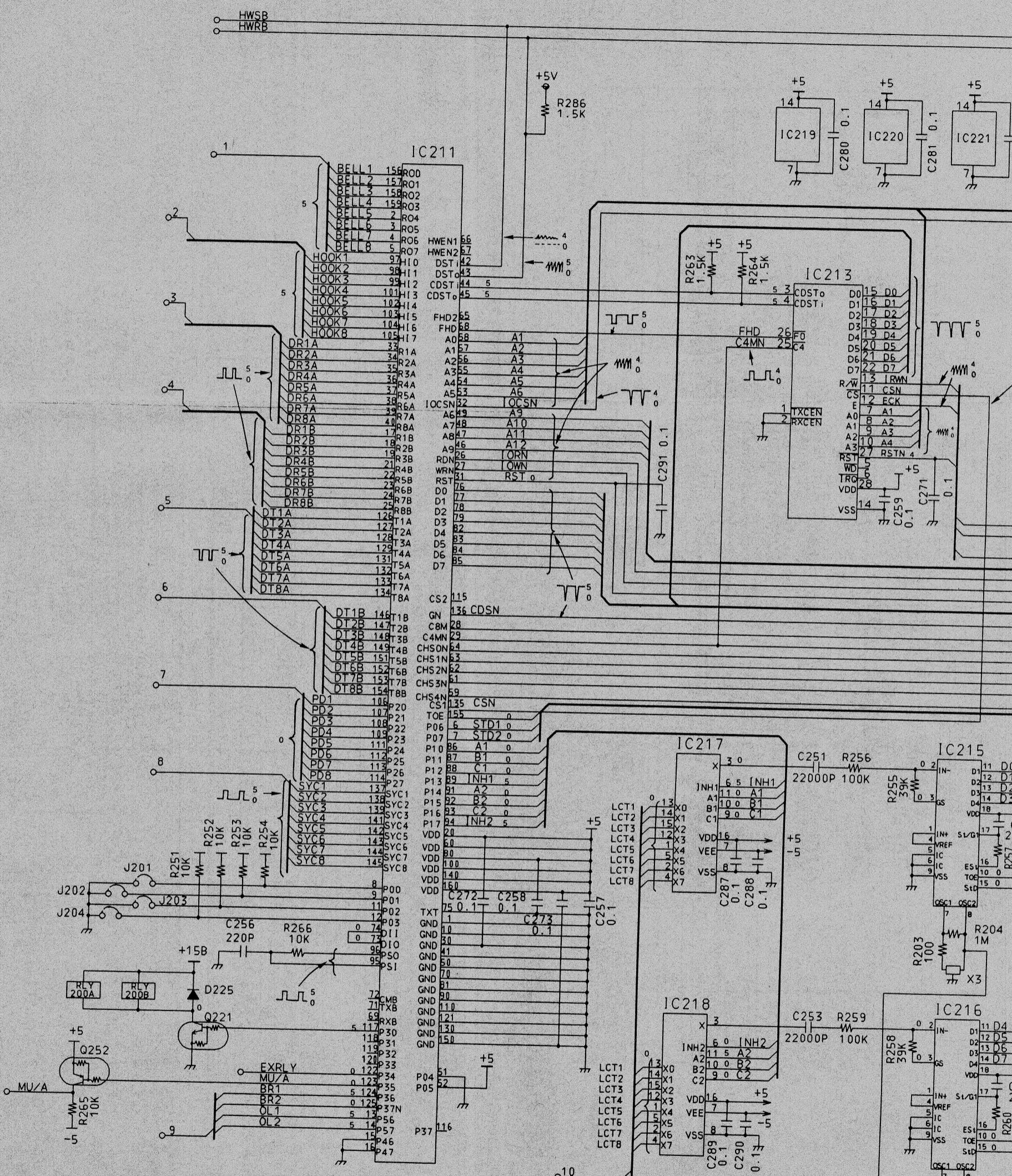
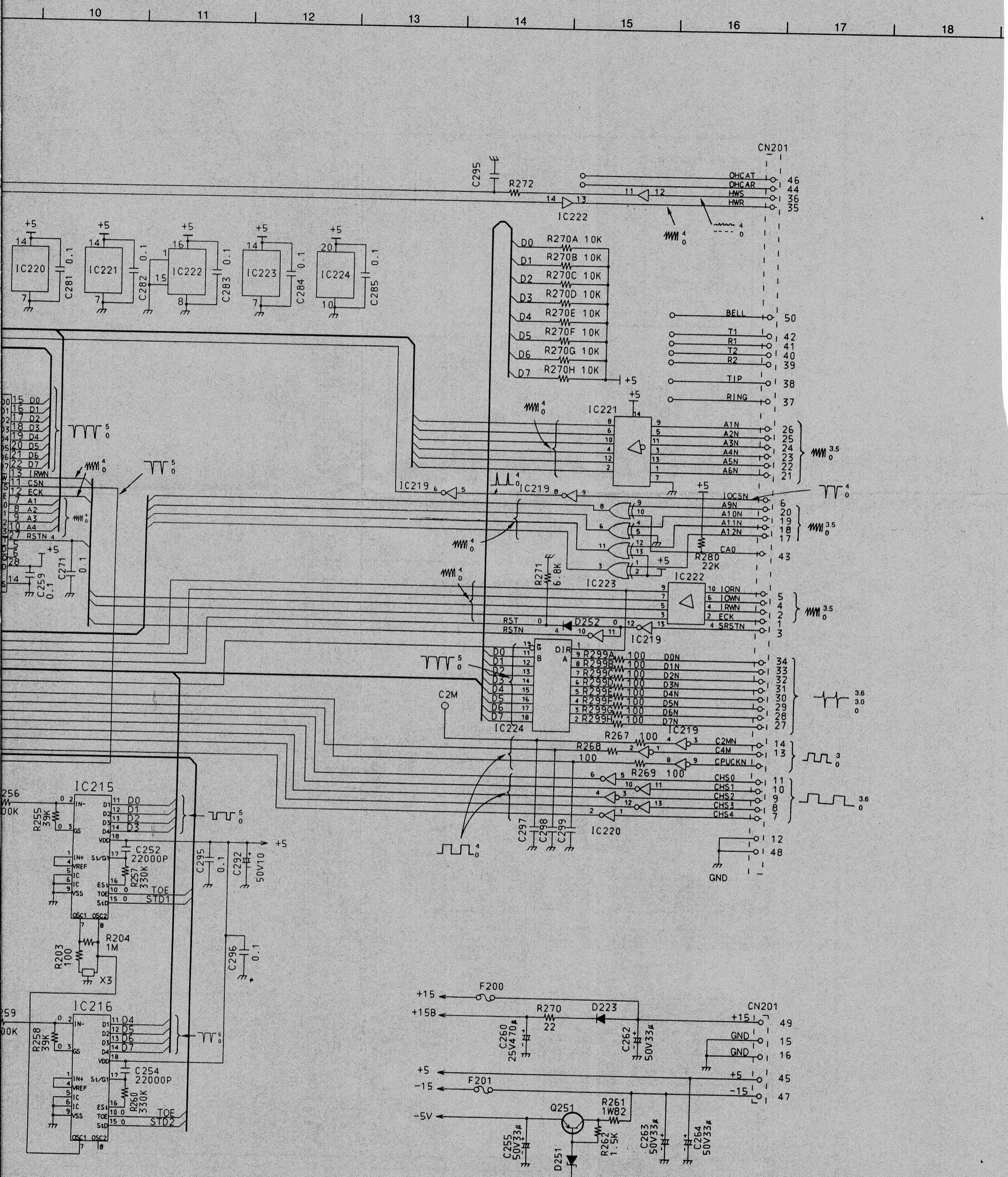


DIAGRAM (EXT. 1/2 CIRCUIT)



PRINTED CIRCUIT BOARD

4 5 6 7 8 9 10

(COMPONENTS)

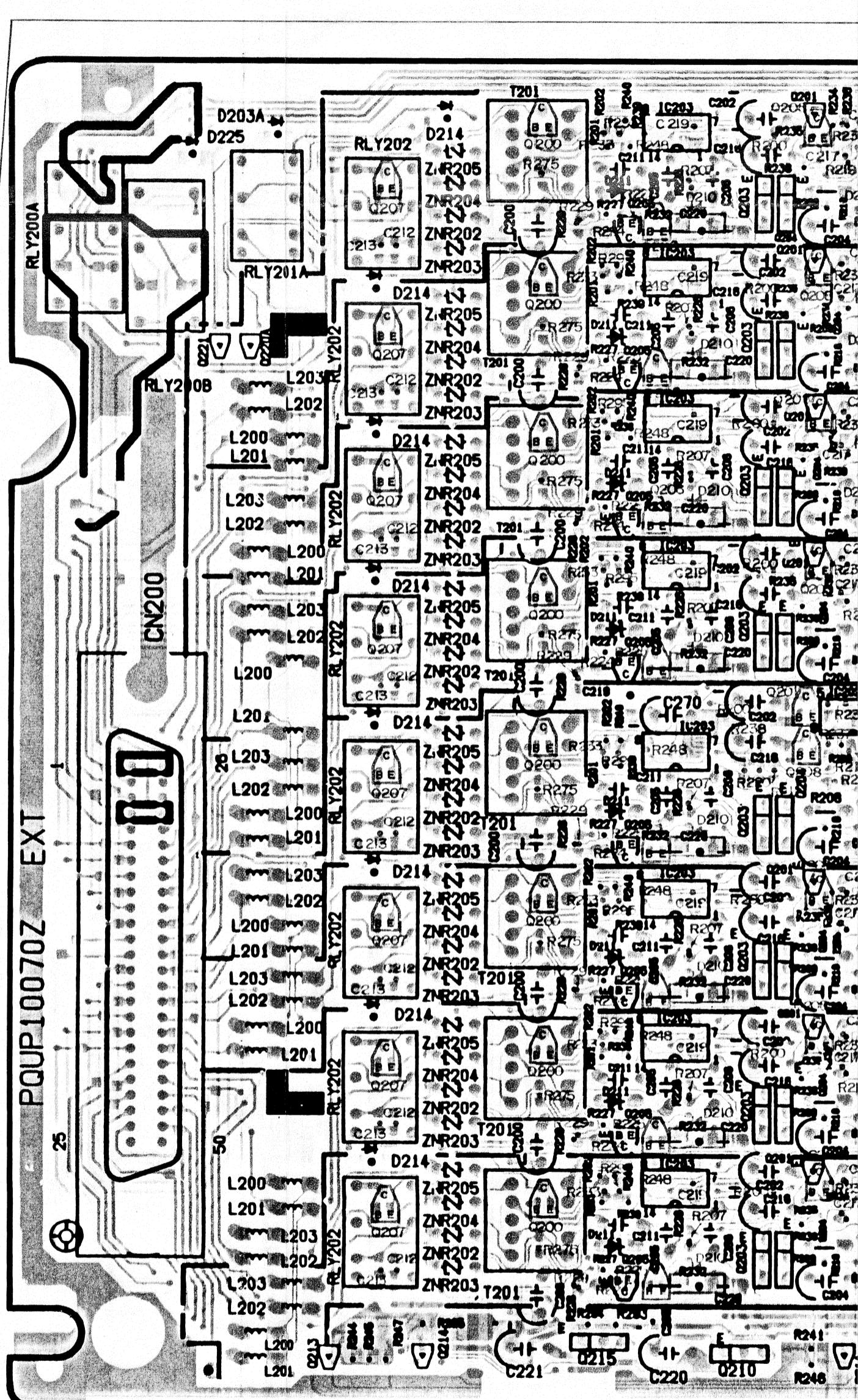
IC213

Pin No.	Voltage & Waveform
3, 4	5
7-10	
11	
12, 13	
15-22	
25	
27	4

Value is V.

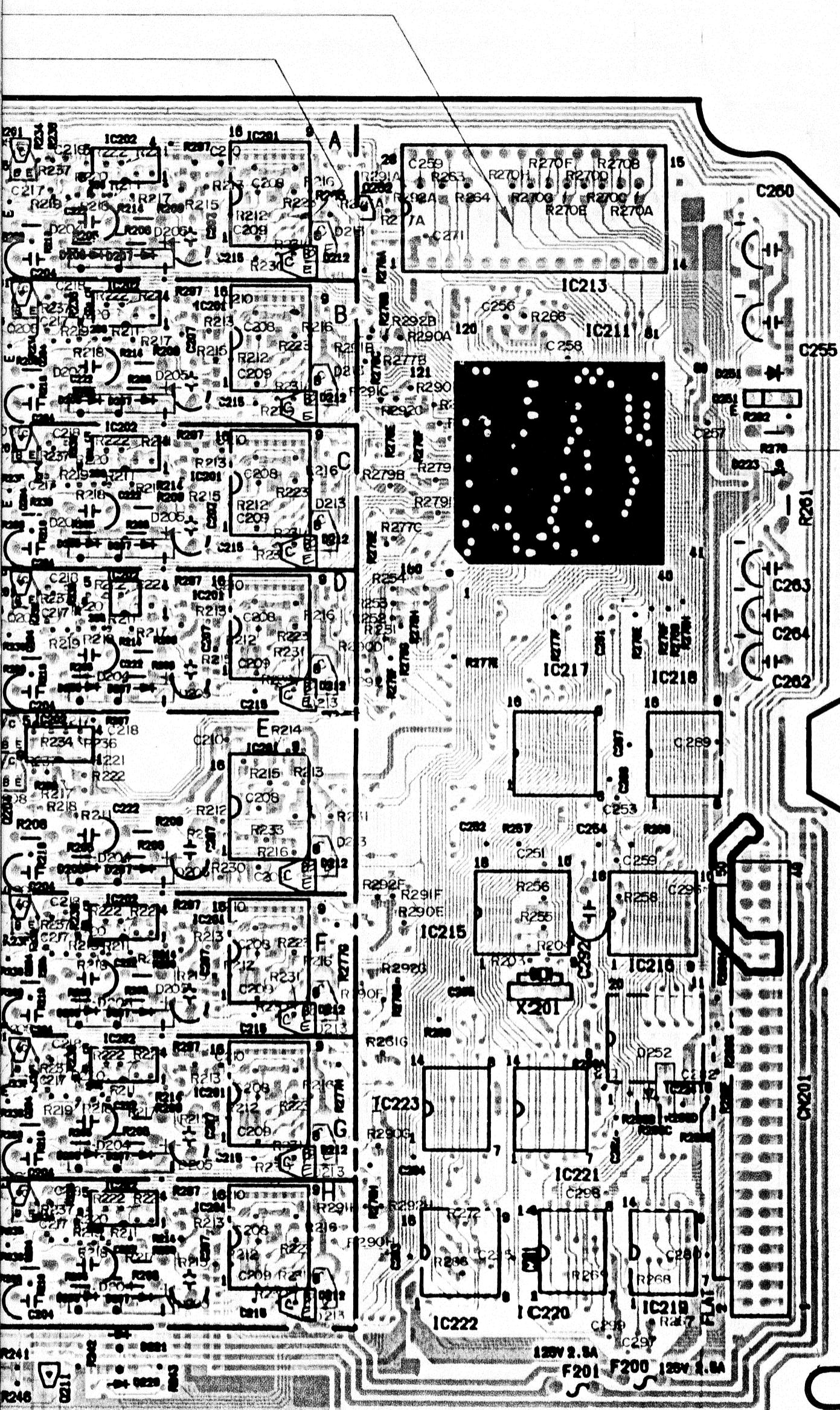
IC201A

Pin No.	Voltage & Waveform
2-5	0
7	
10	
11	
12	
15	

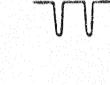
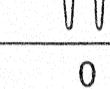
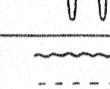
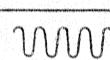
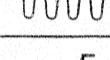
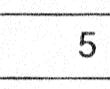
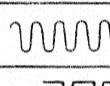
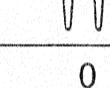
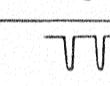
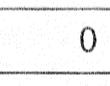
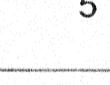
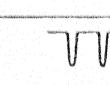
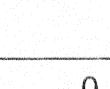


BOARD (EXT. BOARD)

10 |
ONENT VIEW)



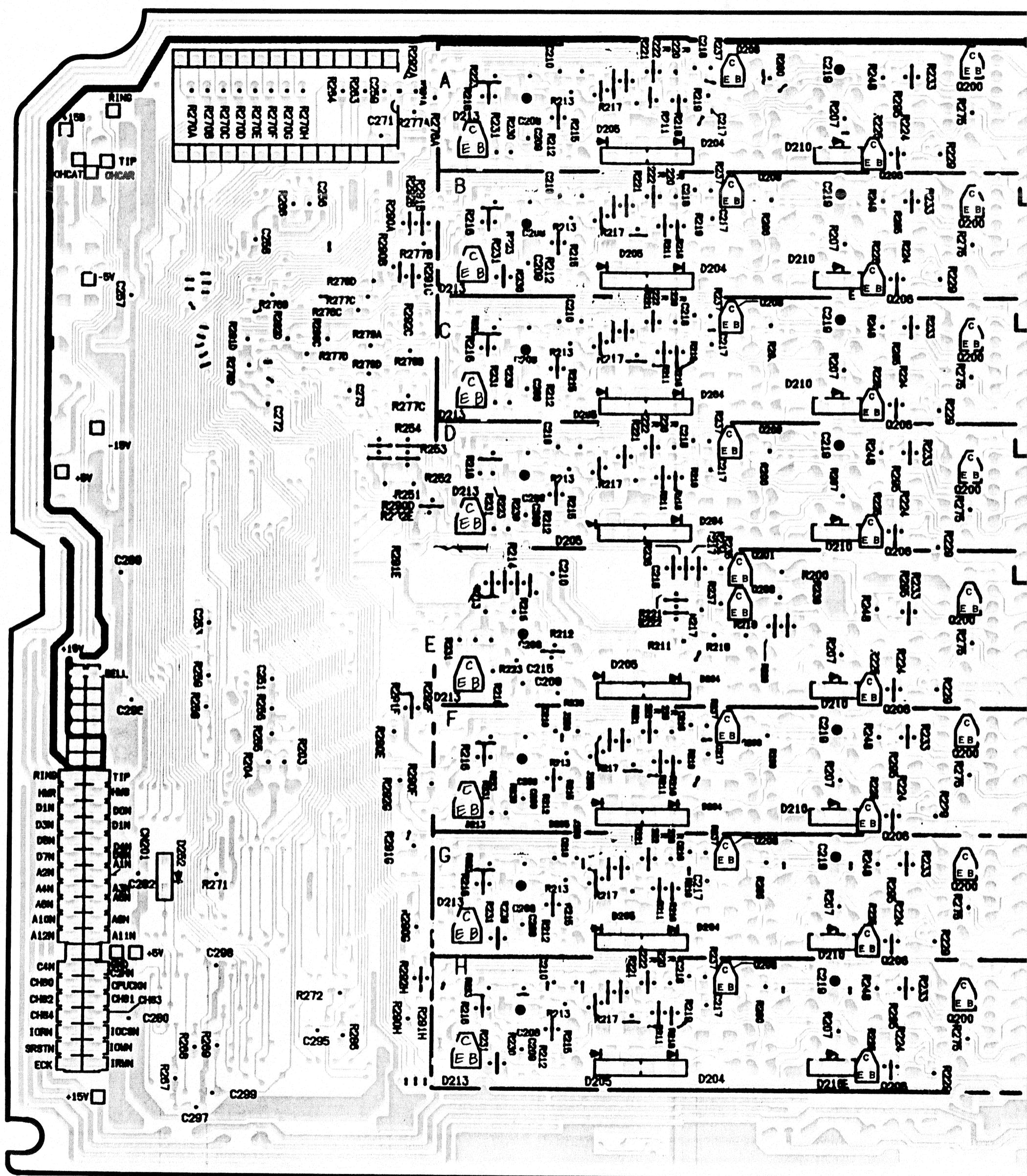
IC211

Pin No.	Voltage & Waveform
2-5	5
6, 7	0
13, 14	5
17-19	 5
21-25	
26, 27	 0
31	0
33-40	 5
42	 4  0
43	 0
44, 45	5
46-49	 0
53-58	 0
68	 5
73, 74	0
76-79	 5
82-85	
86-88	0
89	5
91-93	0
94	5
95, 96	 0
97-99	
101-105	5
106-109	
111-114	0
117	5
122, 123	0
124	5
125	0
126-129	 0
131-134	
137-139	 0
141-145	
146-149	 0
151-154	
155	0
156-159	5

PRINTED CIRCUIT BOARD (EXT. BOARD)

6 7 8 9 10 11 12

(BOTTOM VIEW)



RD)

12

13

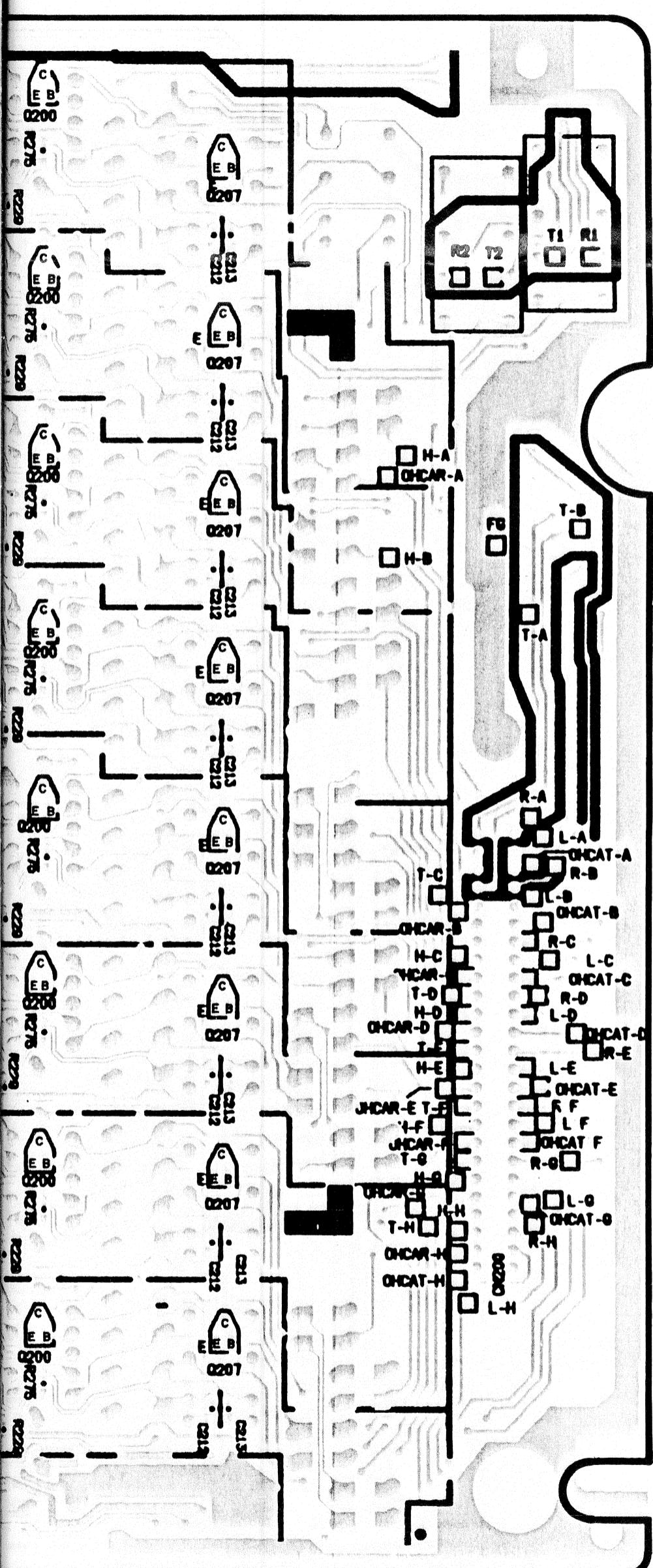
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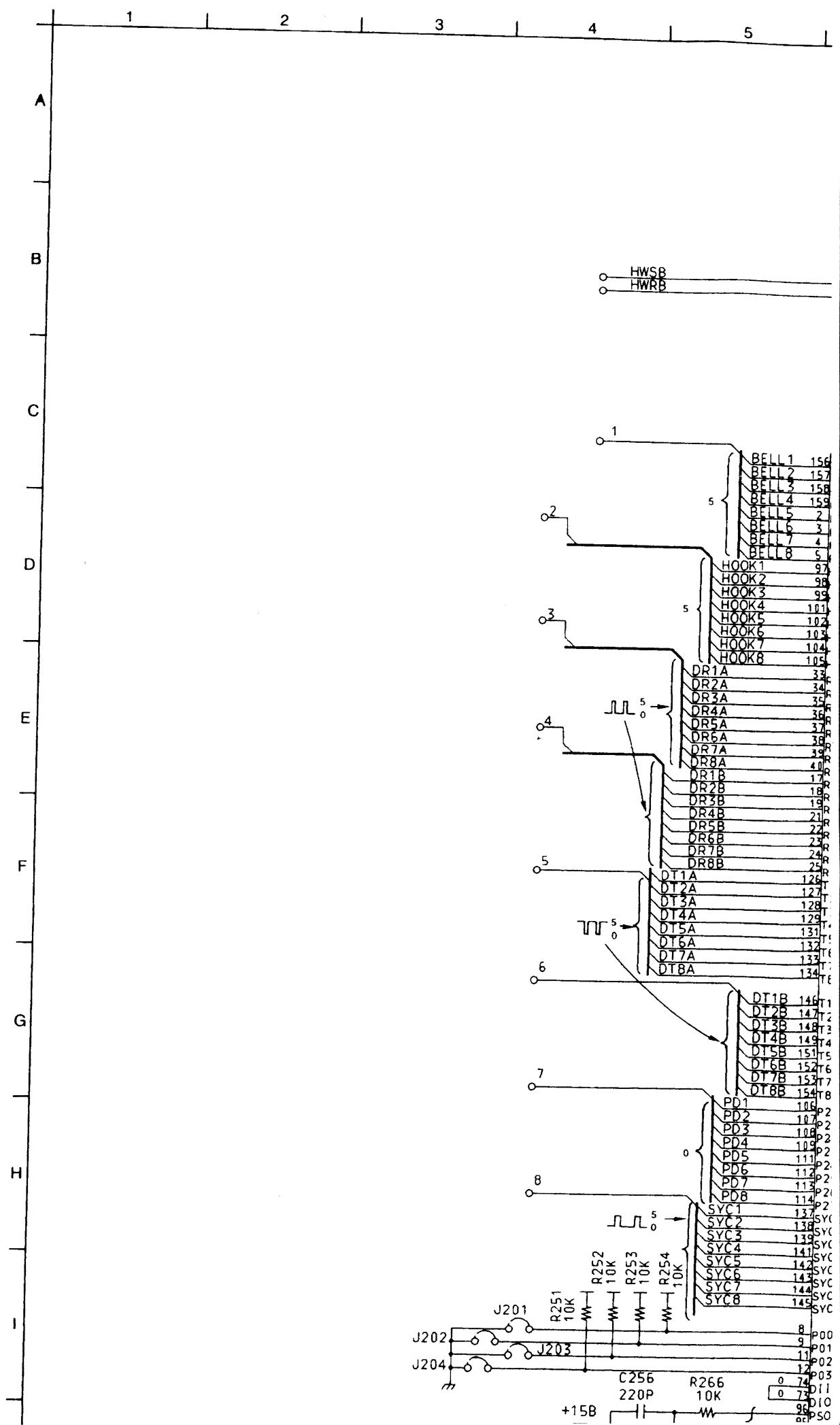
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16

17

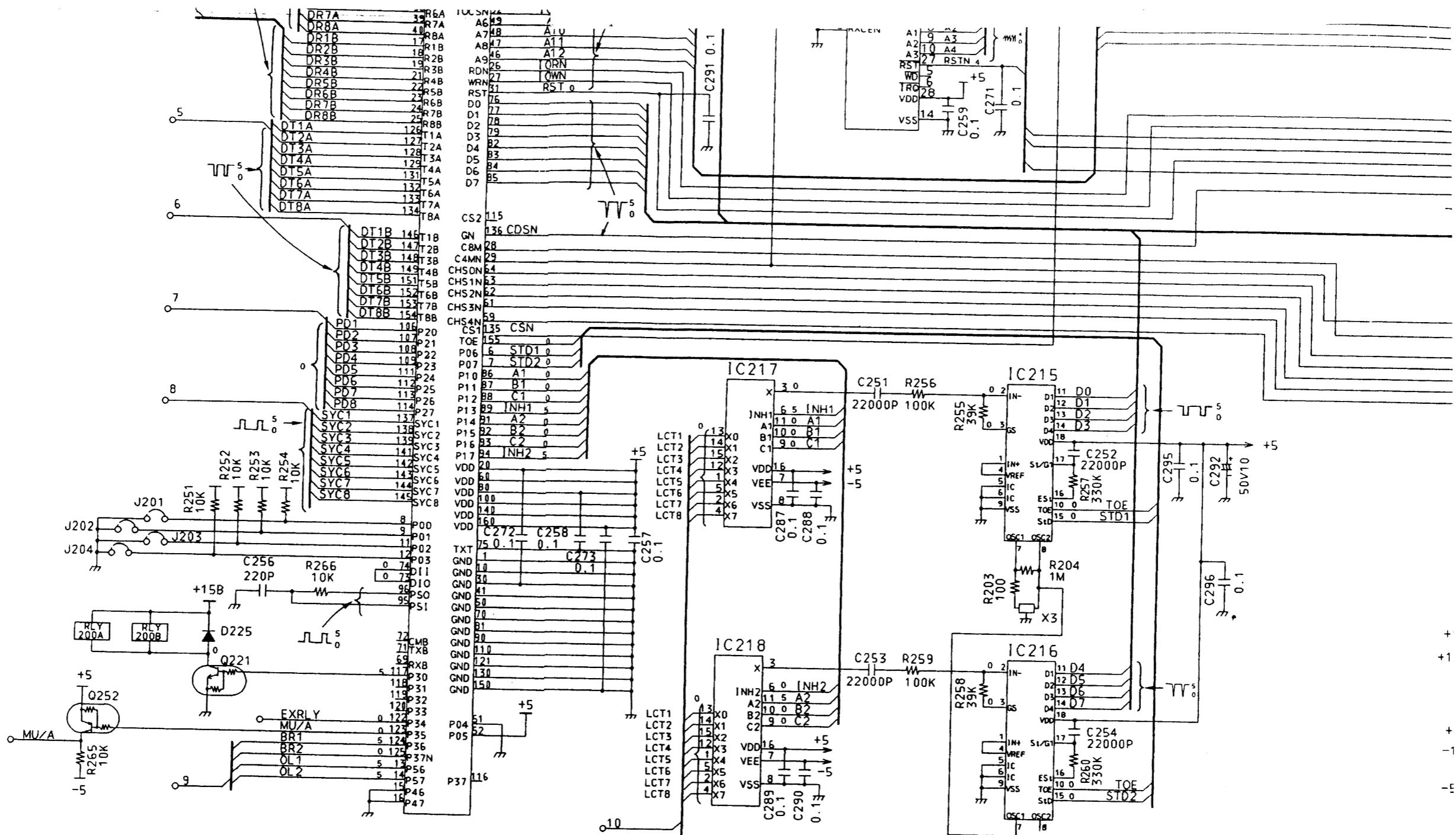
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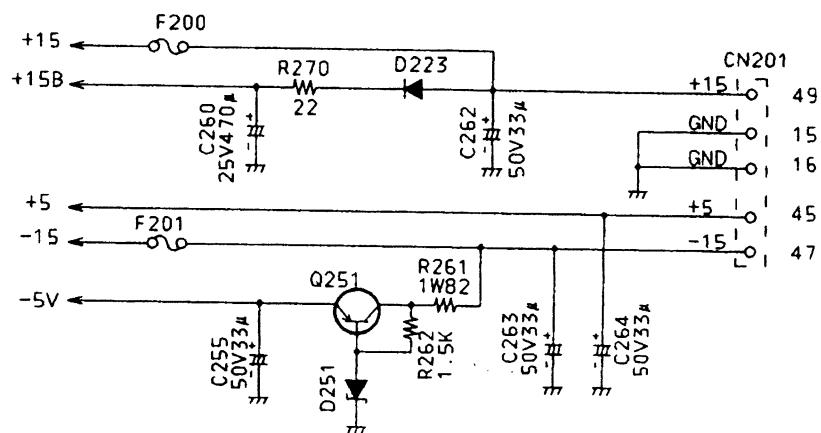
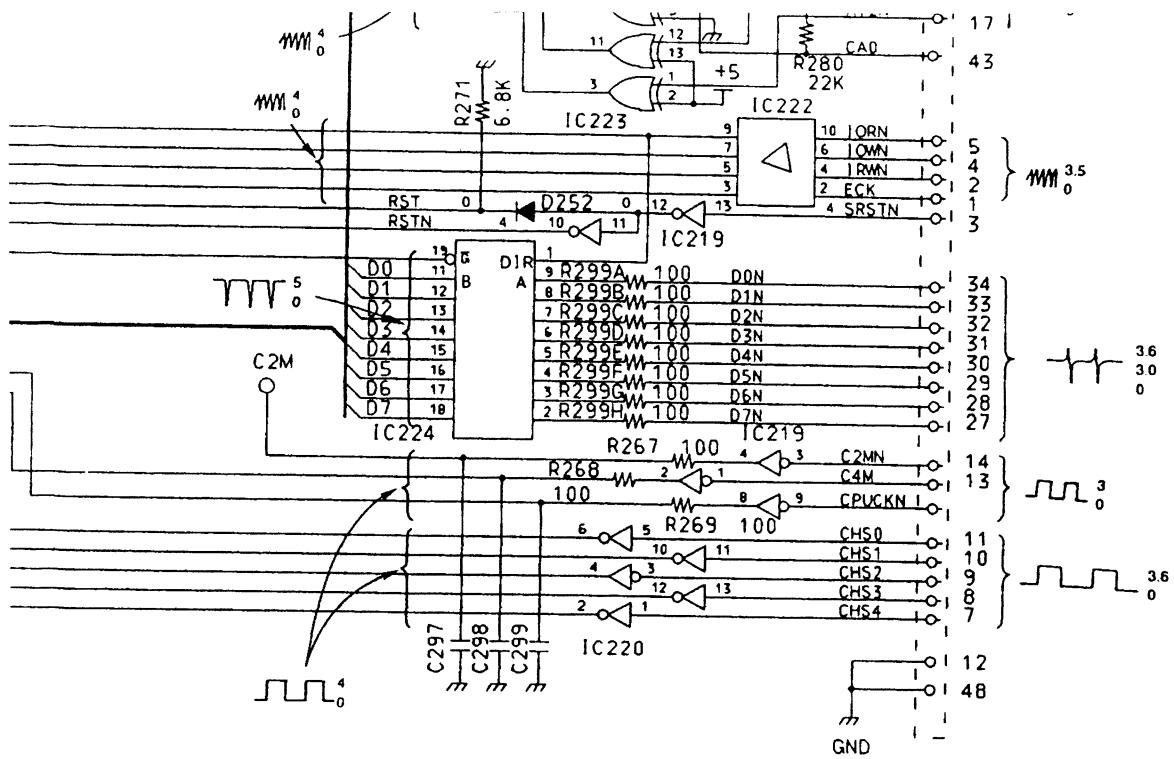




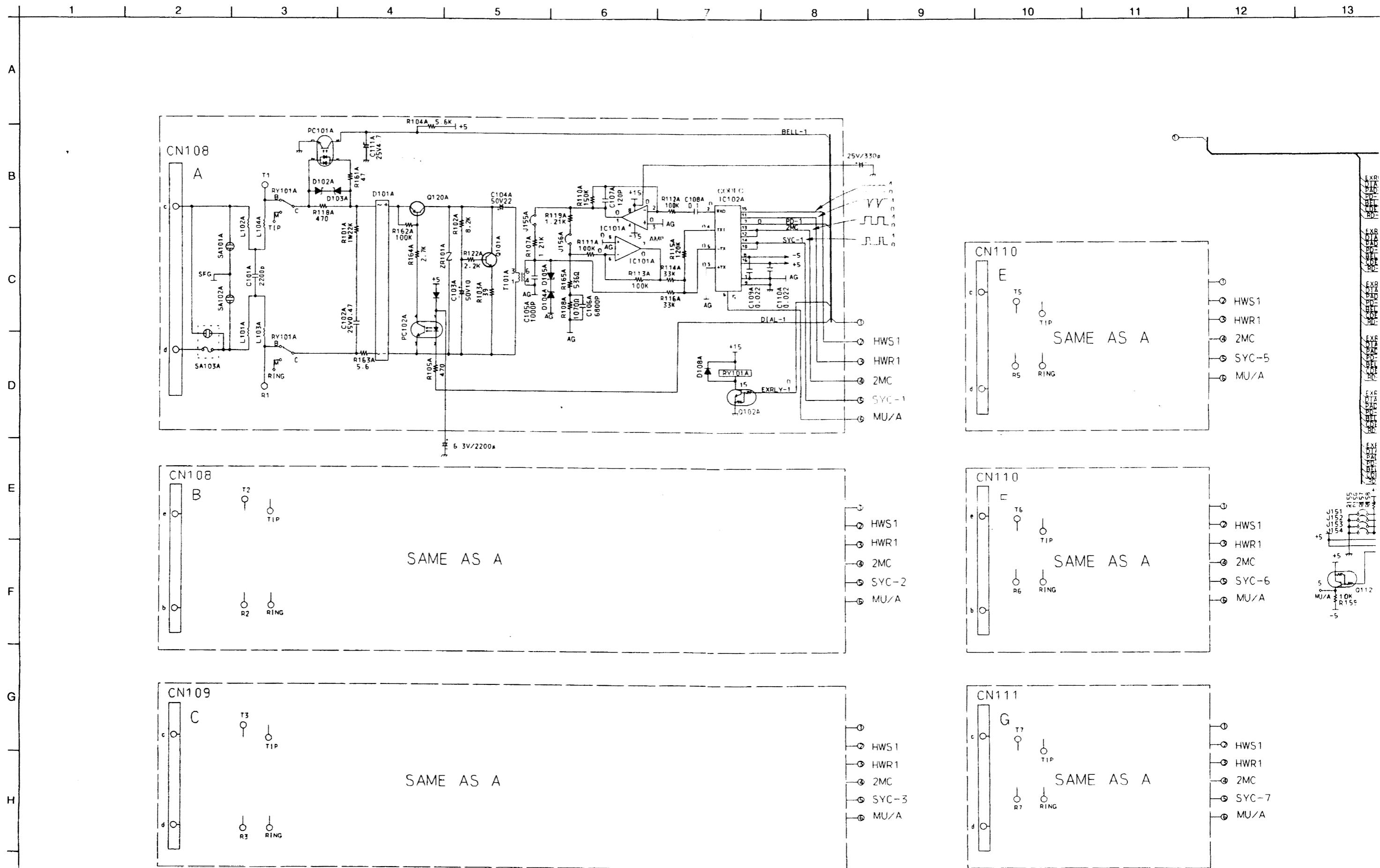
SCHEMATIC DIAGRAM (EXT. 1/2 CIRCUIT)

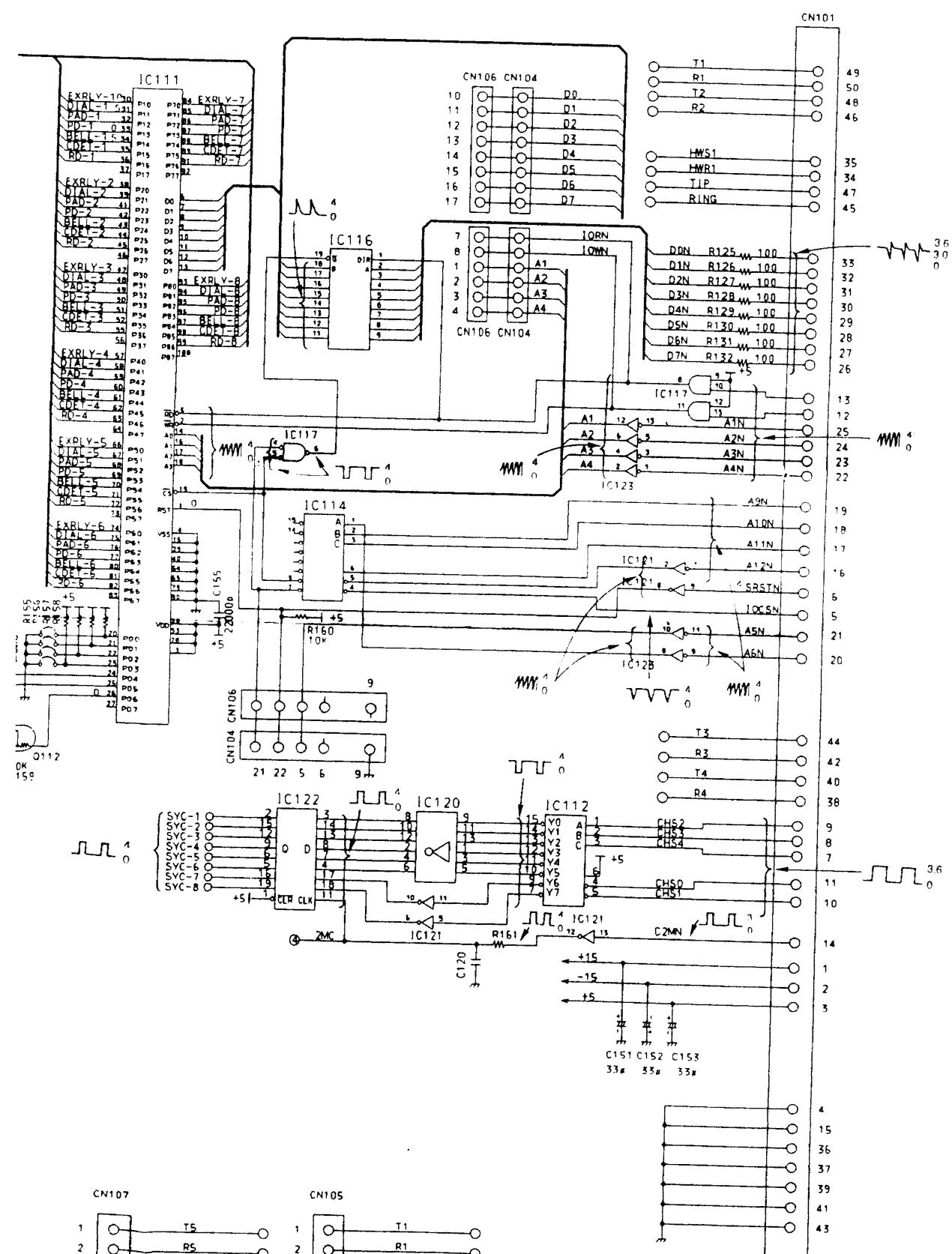


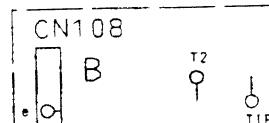




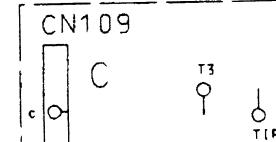
SCHEMATIC DIAGRAM (CO CIRCUIT)



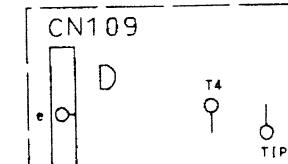




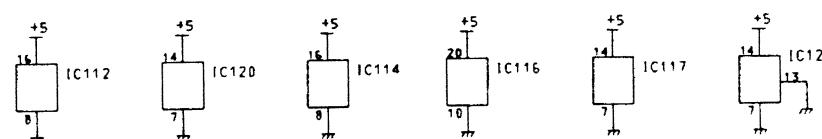
SAME AS A



SAME AS A

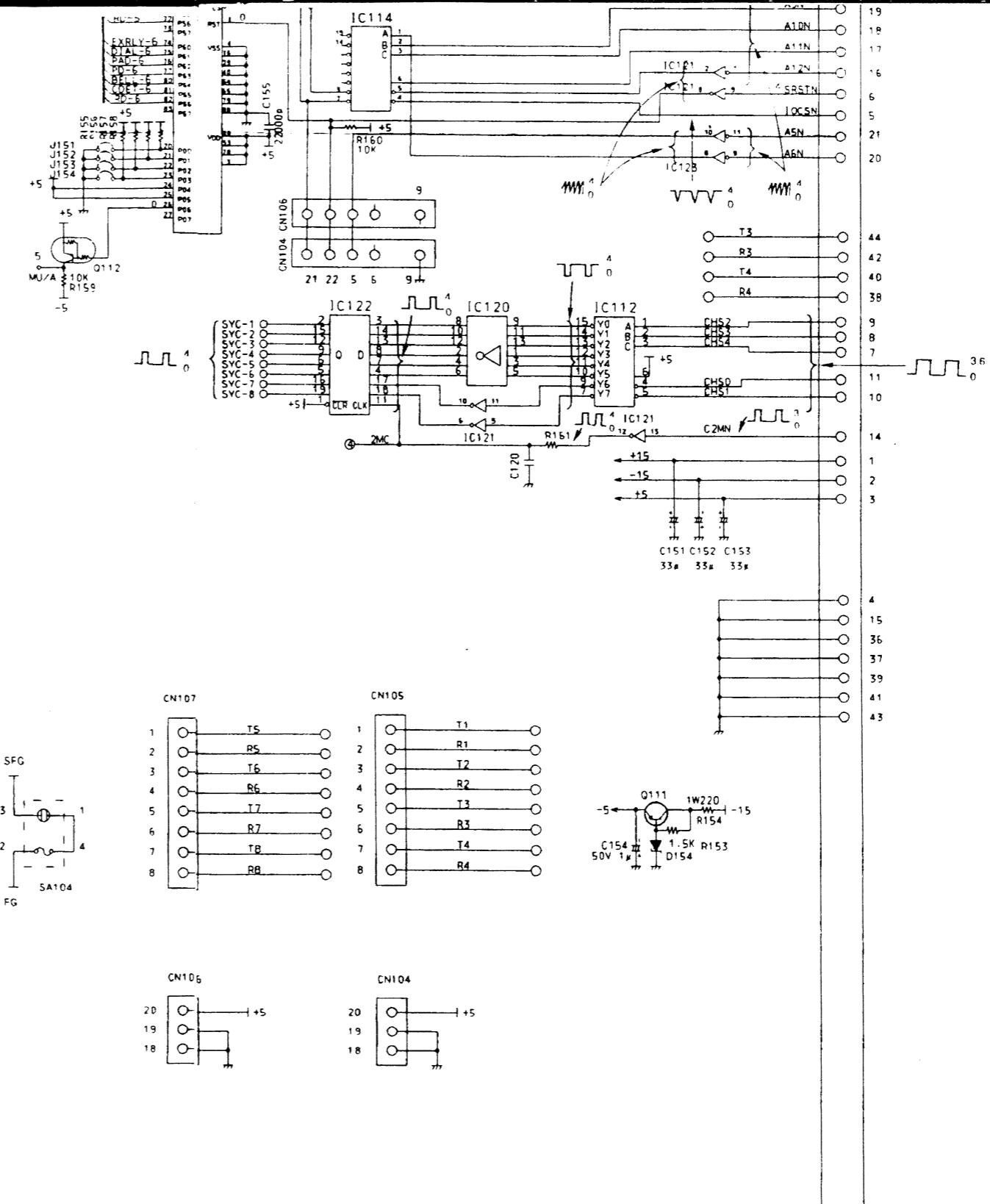
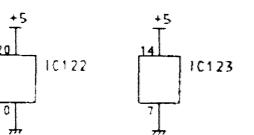
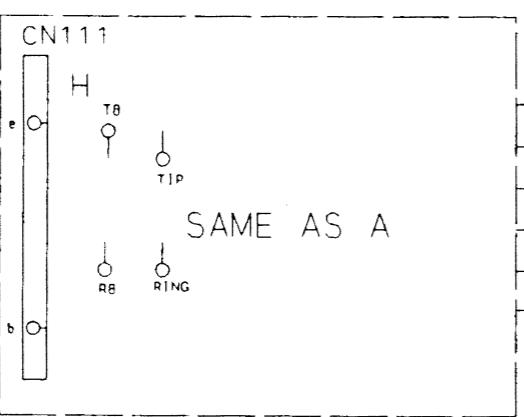
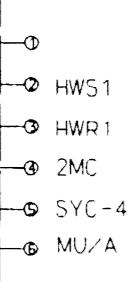
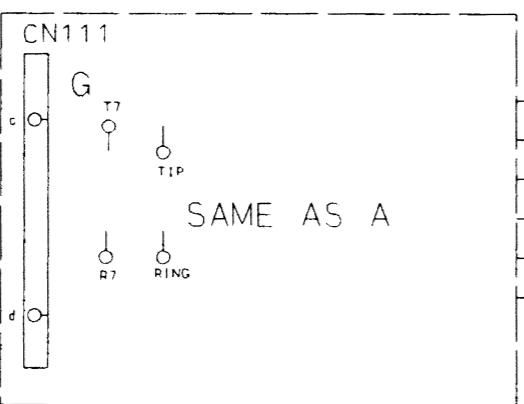
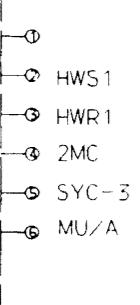
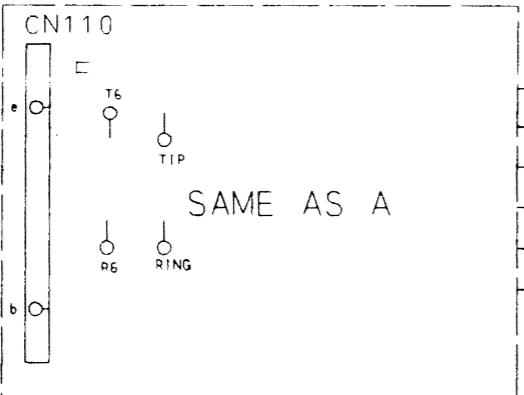
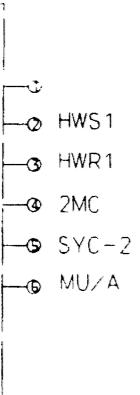


SAME AS A

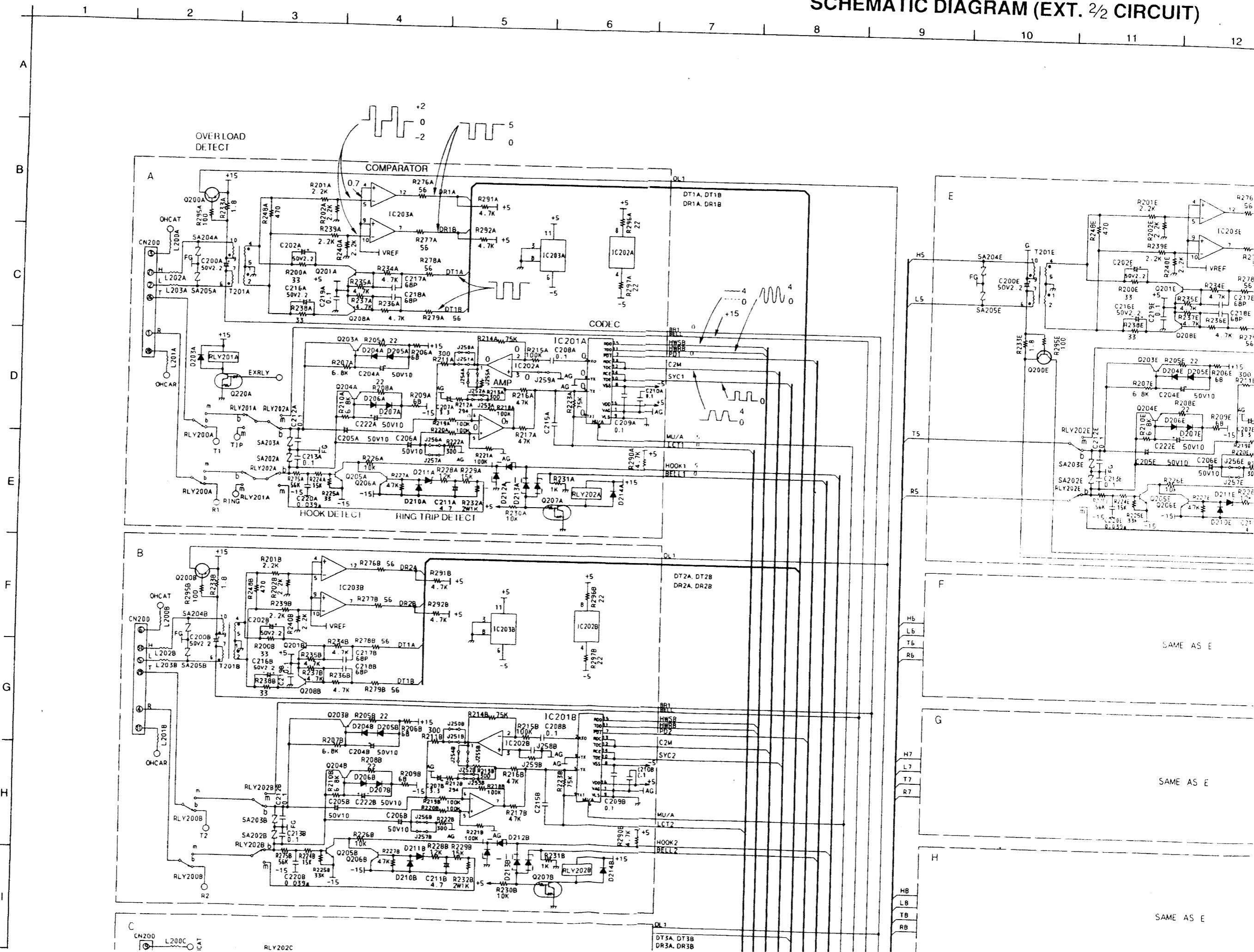


L

M



SCHEMATIC DIAGRAM (EXT. 2/2 CIRCUIT)



13

14

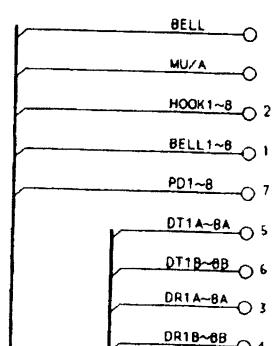
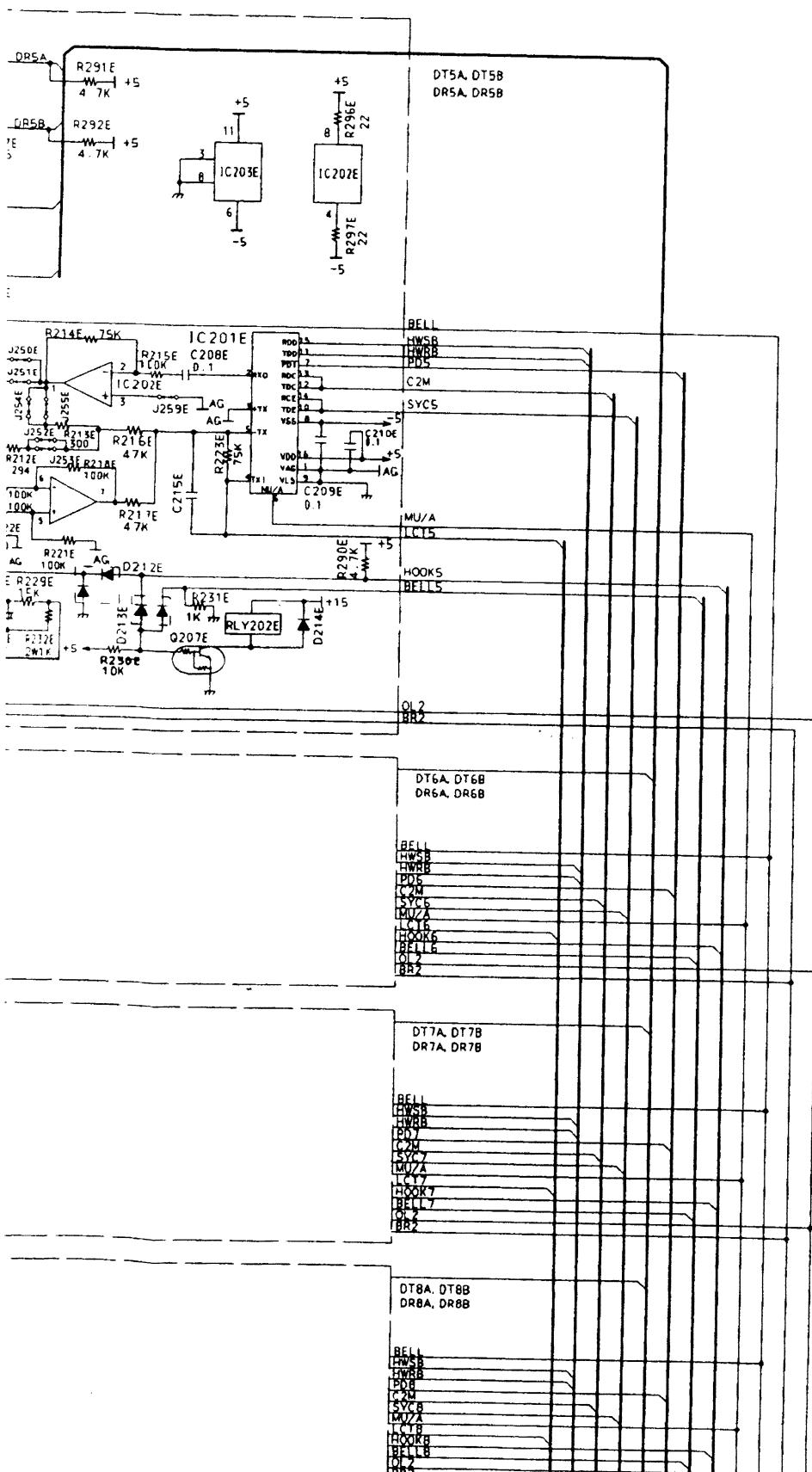
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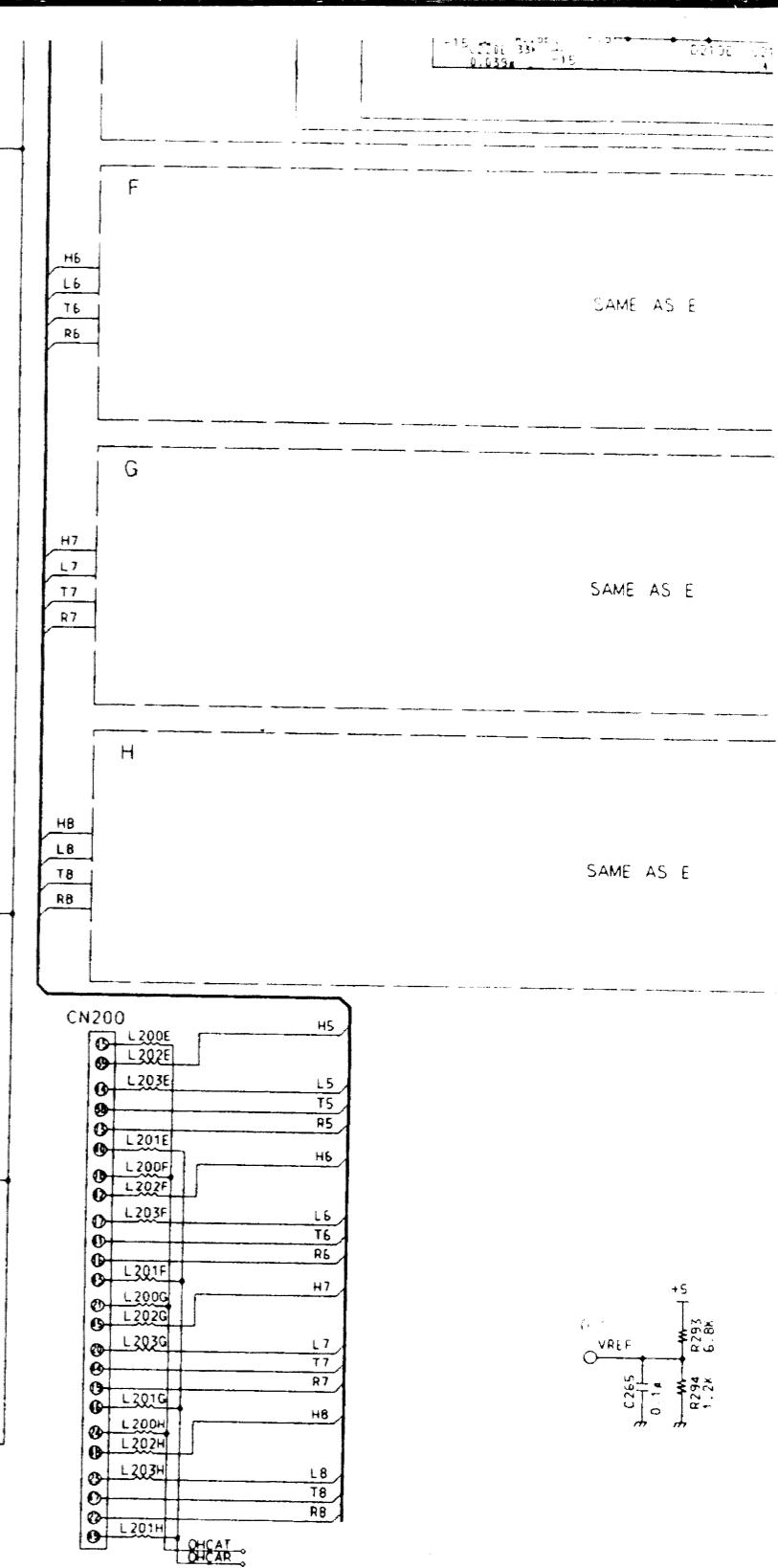
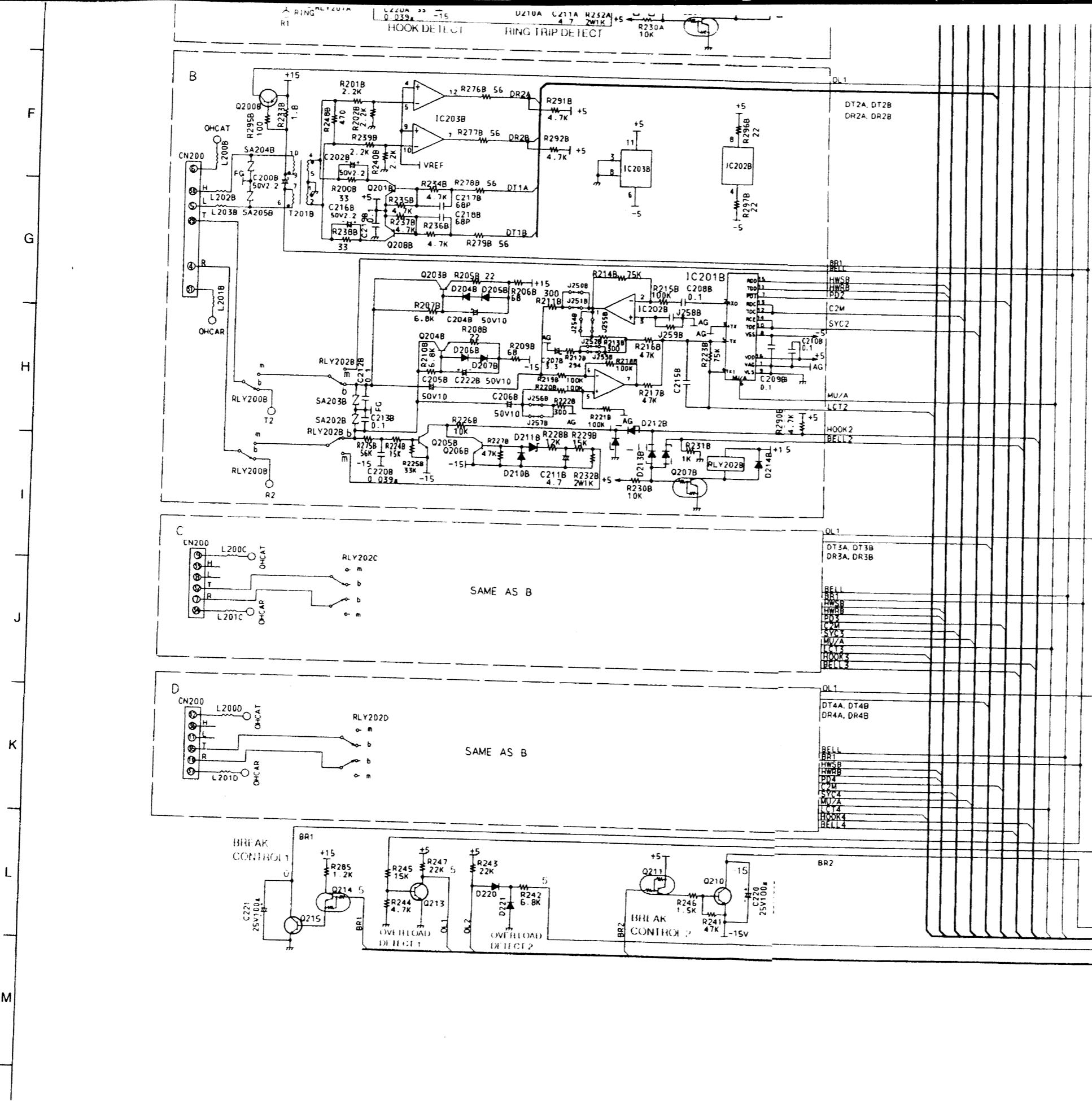
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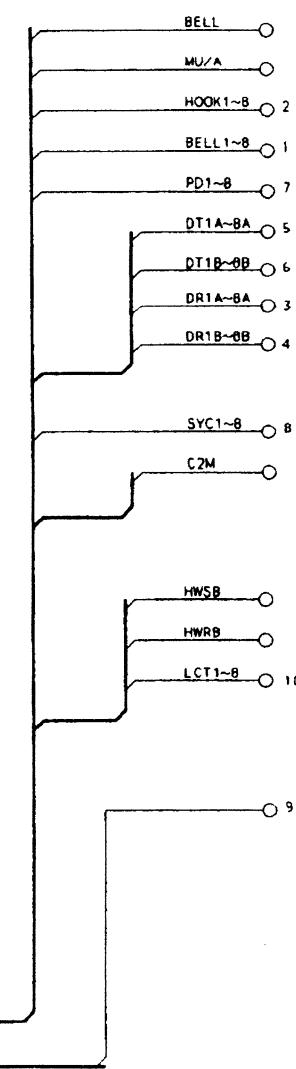
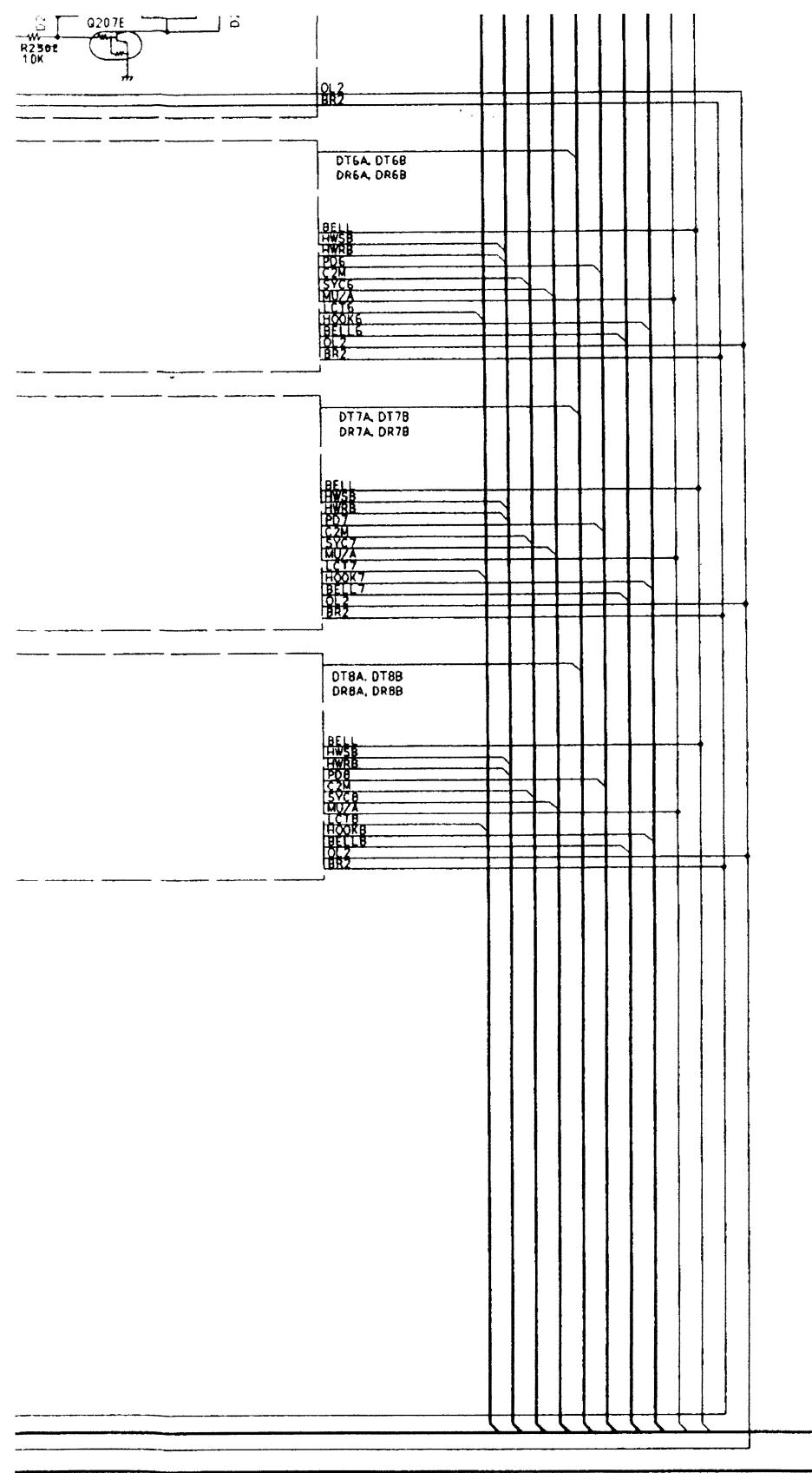
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18

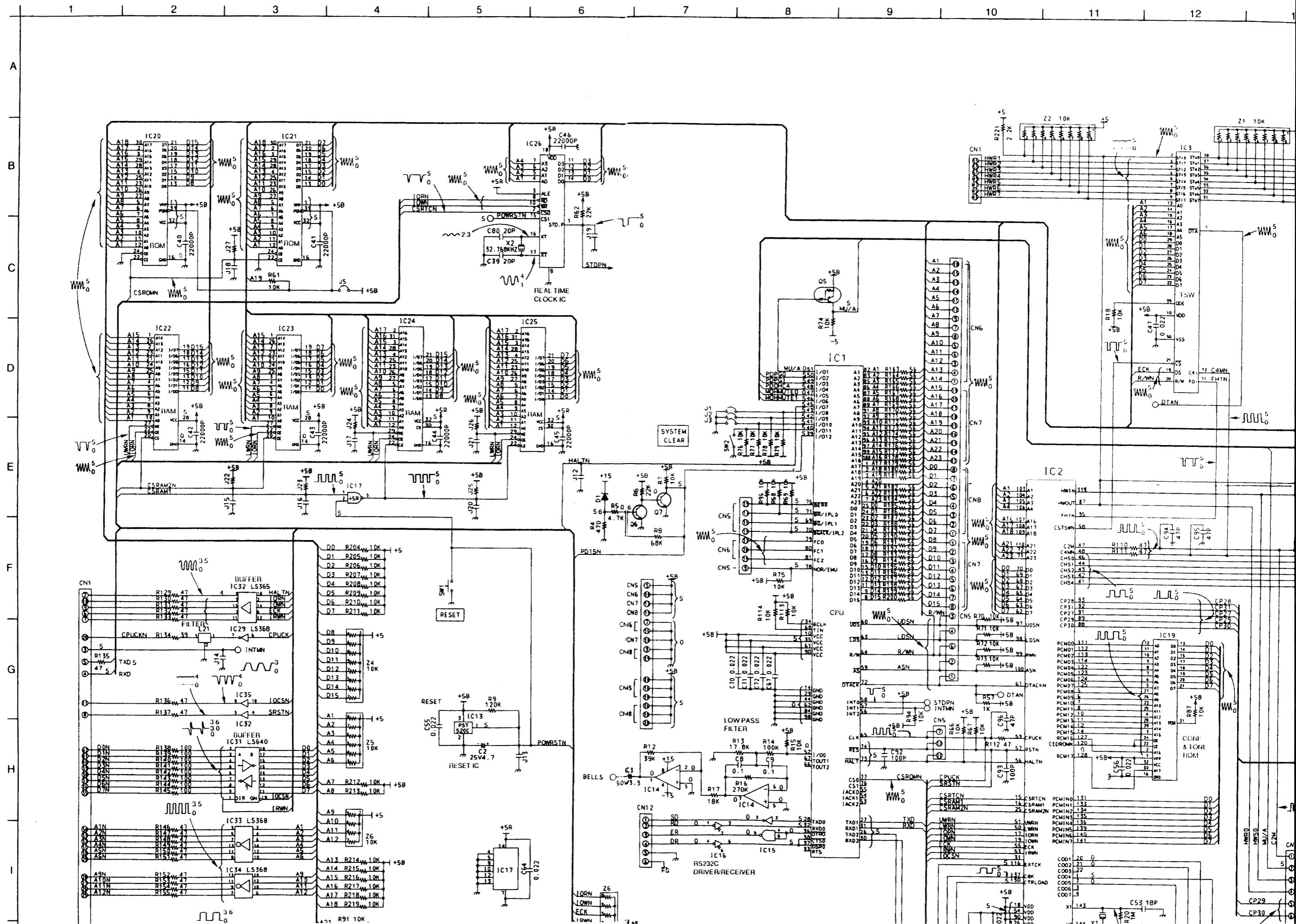
1







SCHEMATIC DIAGRAM (CPU CIRCUIT)



13

14

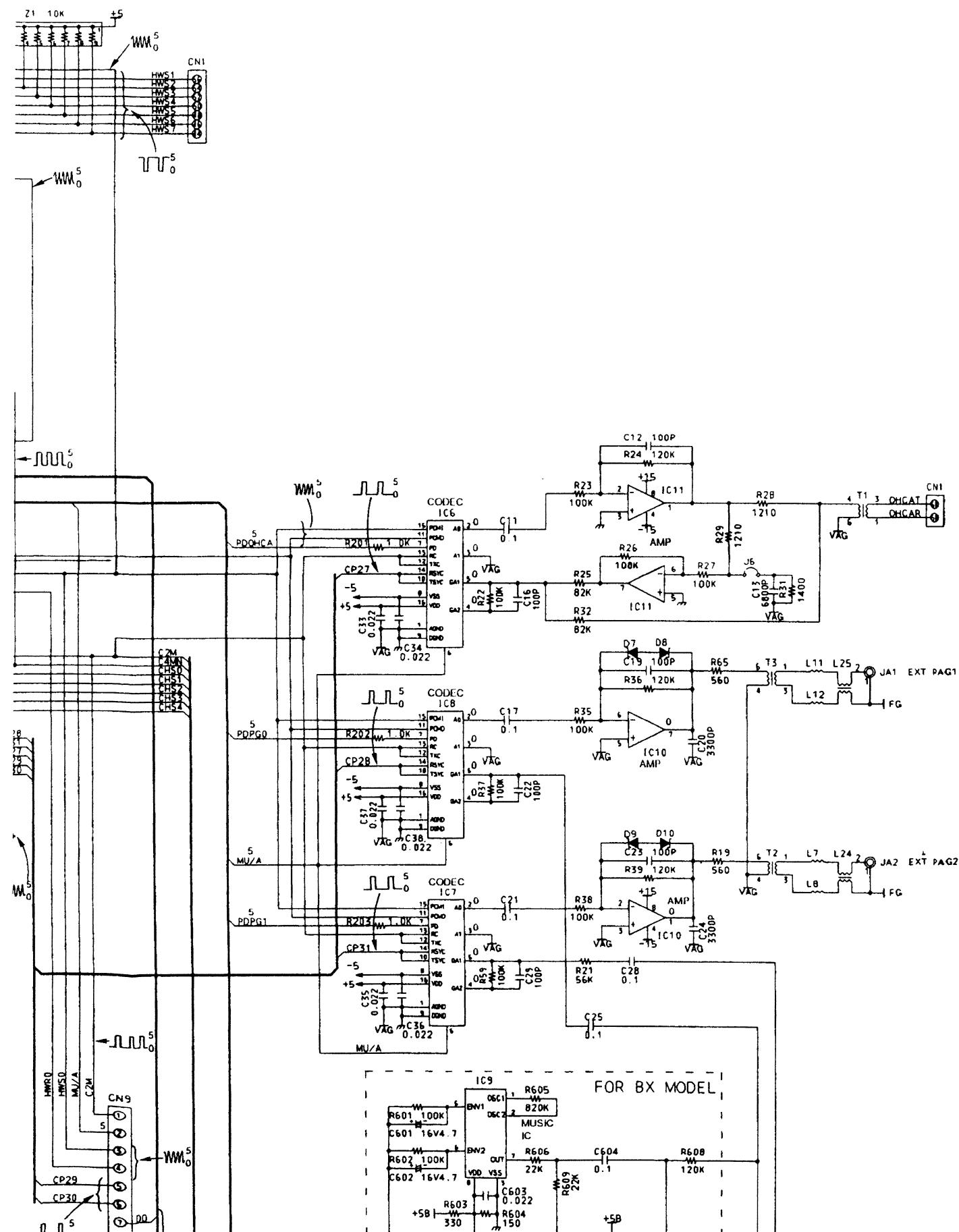
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16

17

18

19



F

G

H

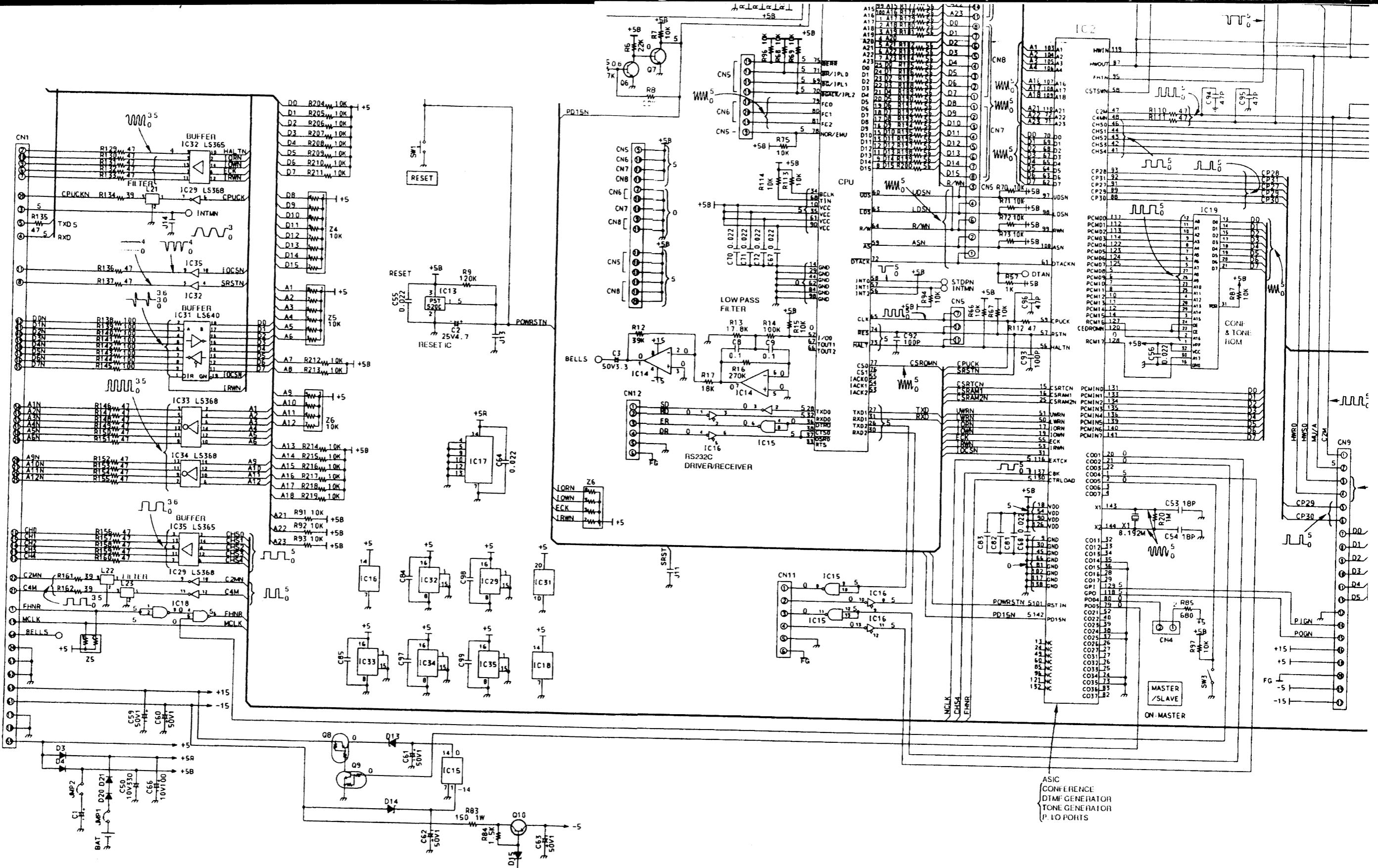
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J

K

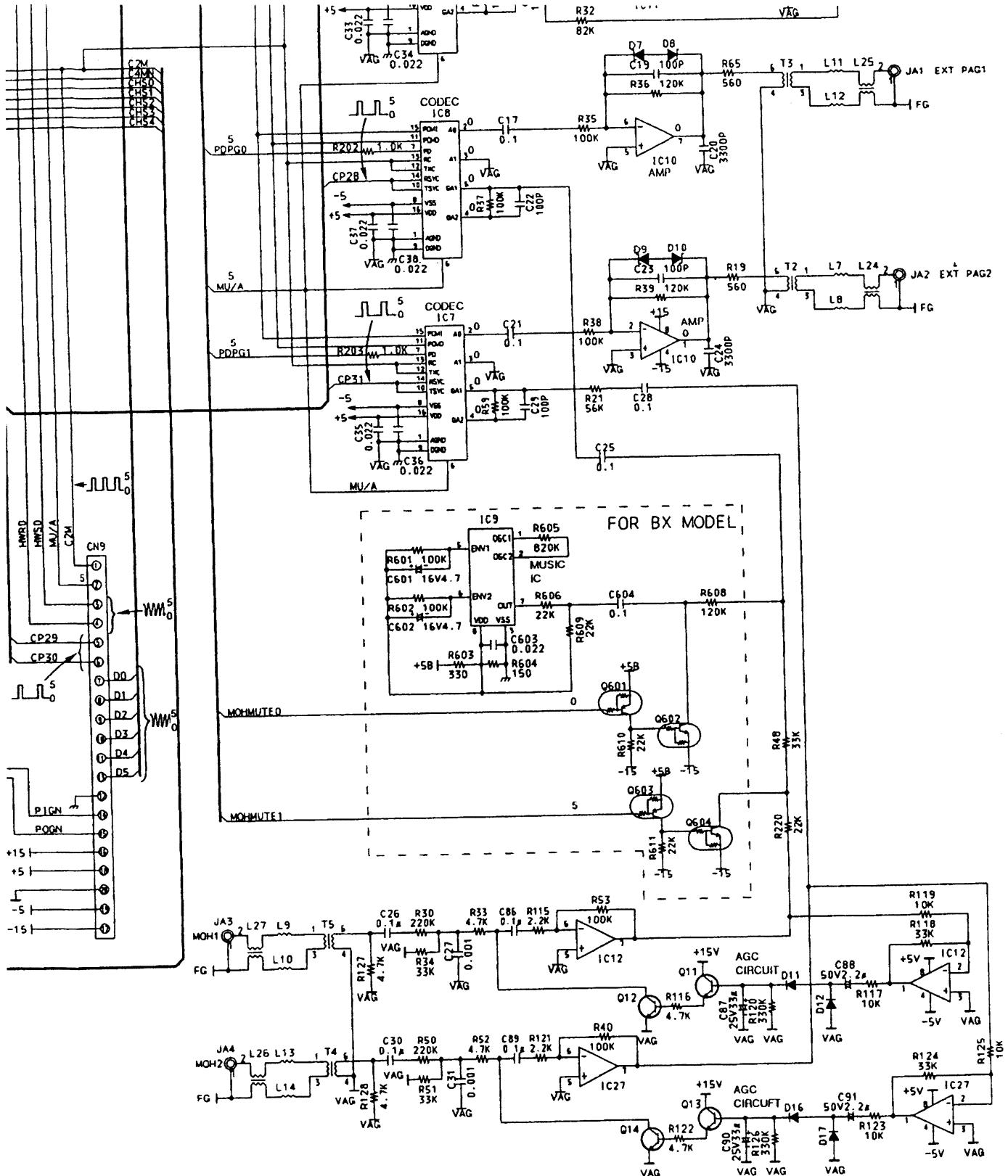
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M

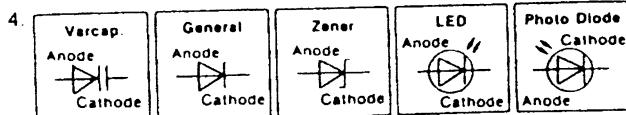
**Note:**

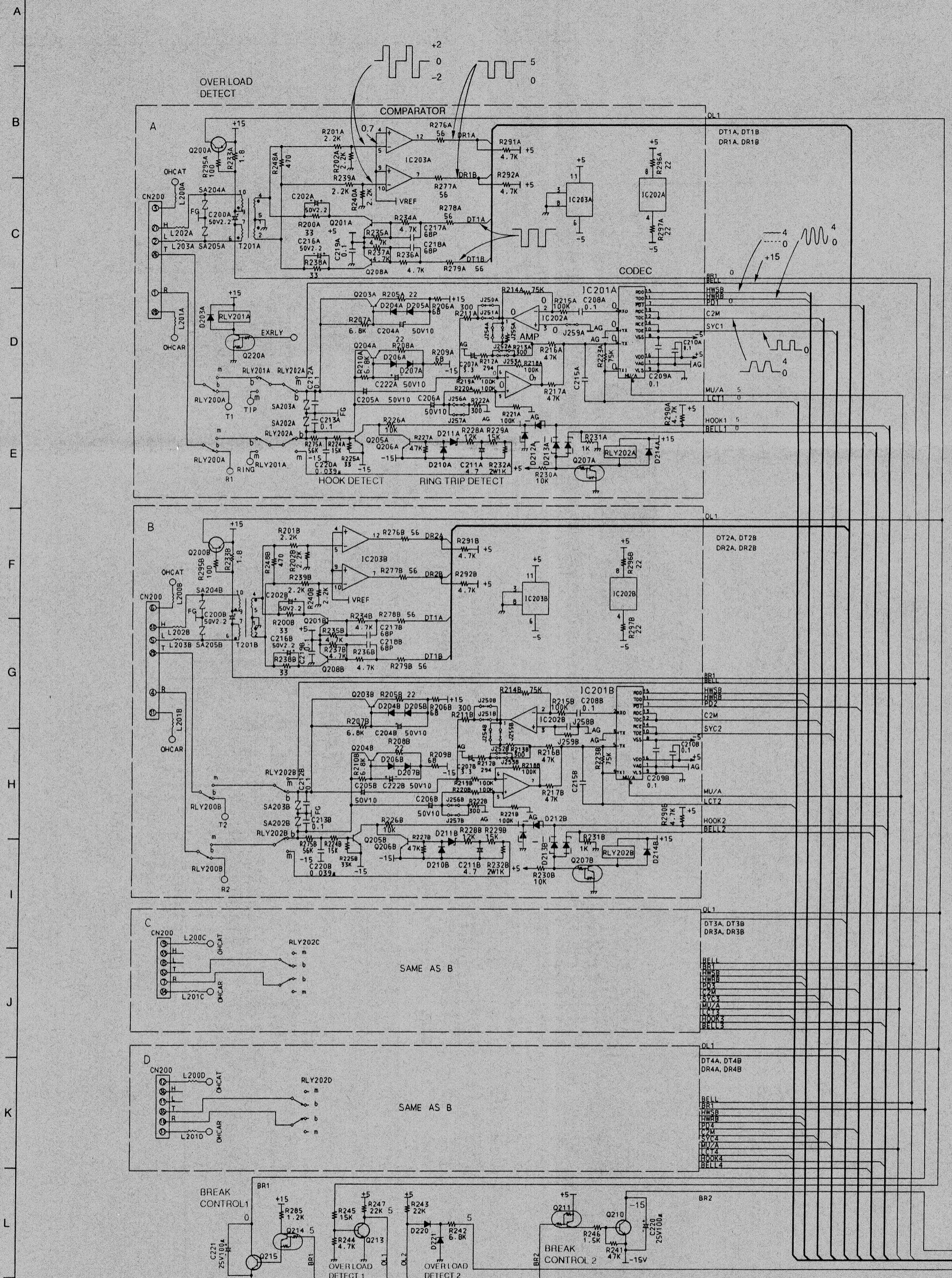
- DC voltage measurements are taken with oscilloscope from ground line.
(Waiting condition. Value is V.)
- The schematic diagram may be modified at any time with the development of new technology.

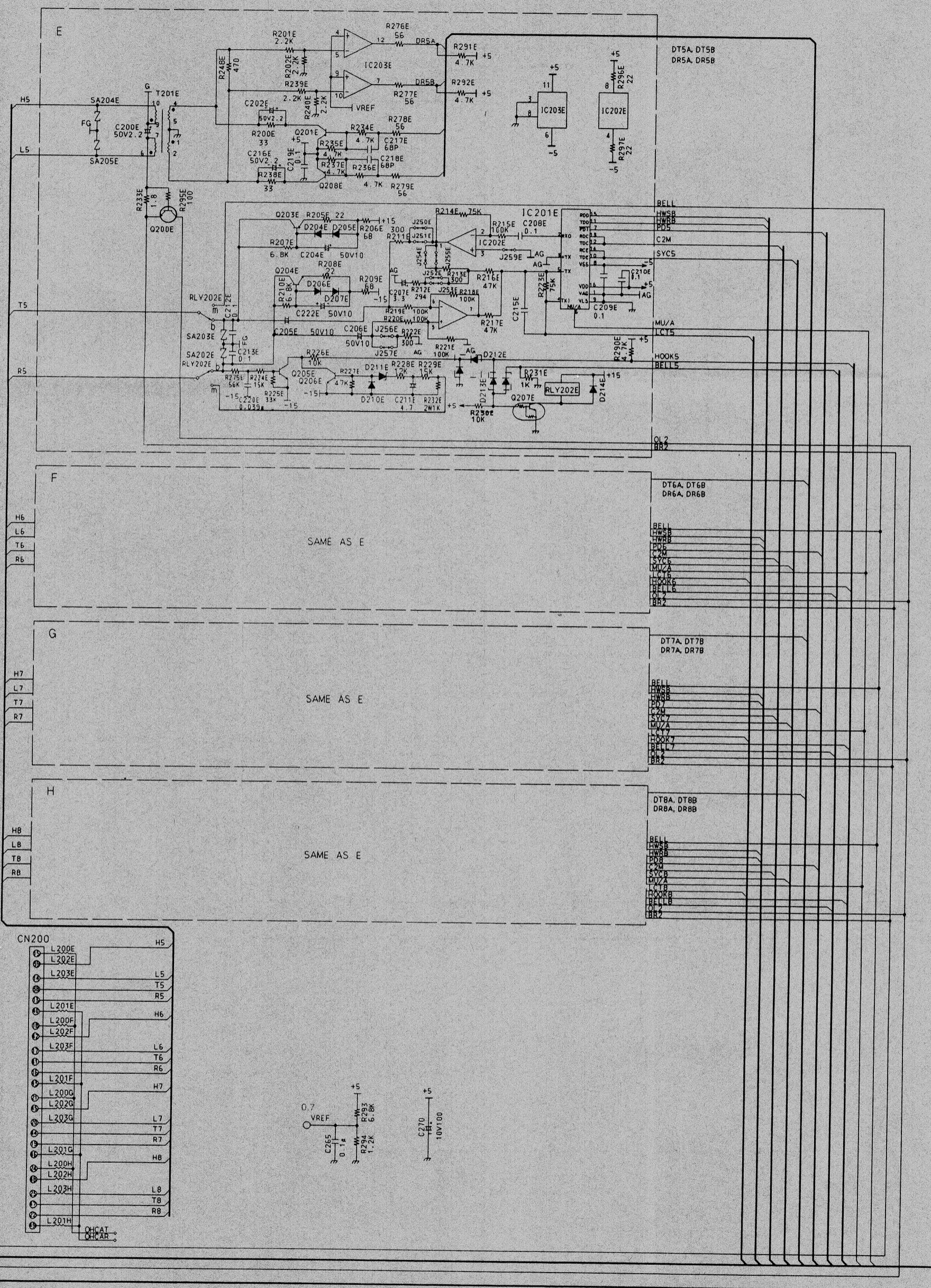
Important safety notice
Components identified by mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.



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g any of
specified

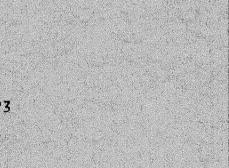
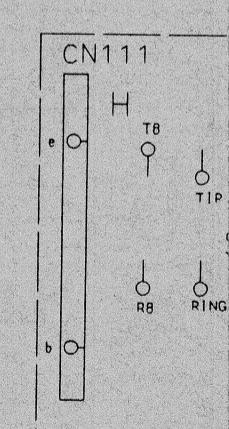
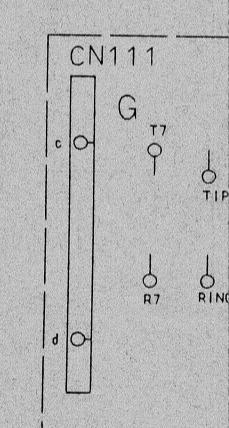
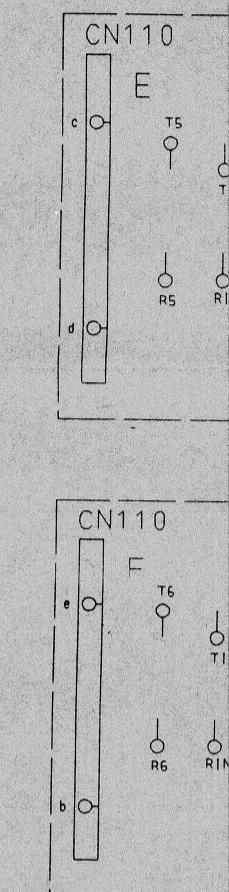
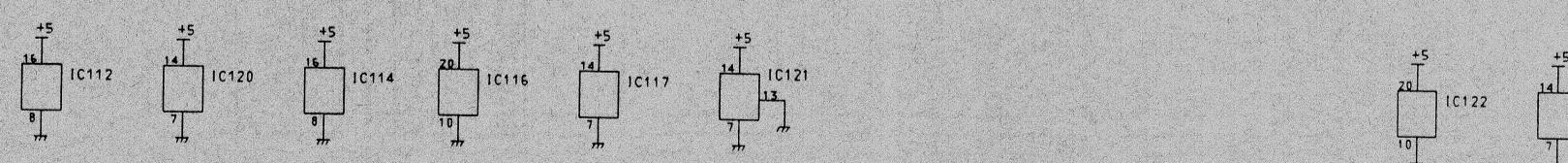
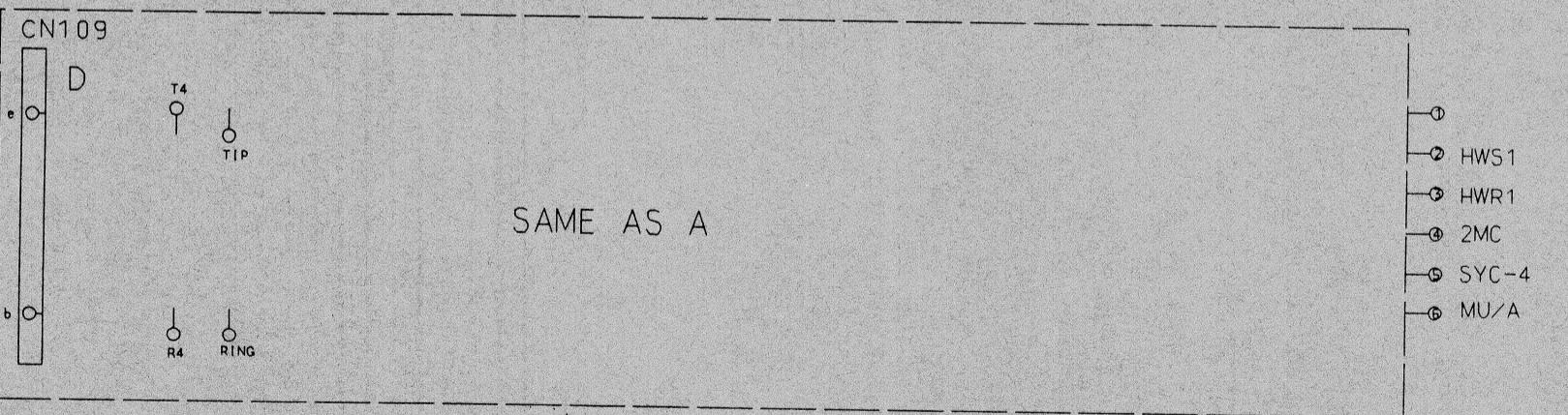
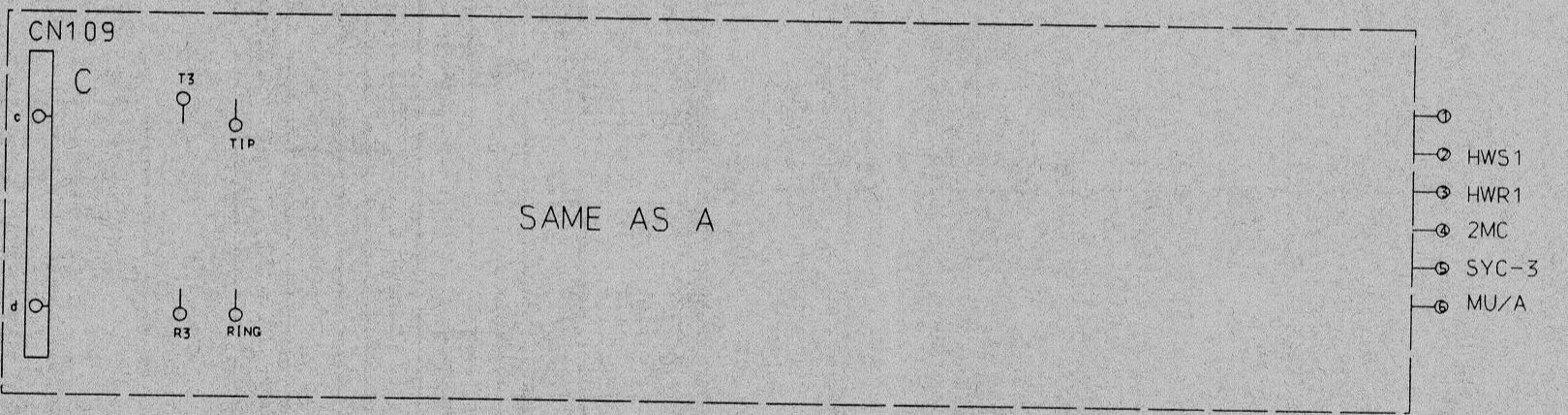
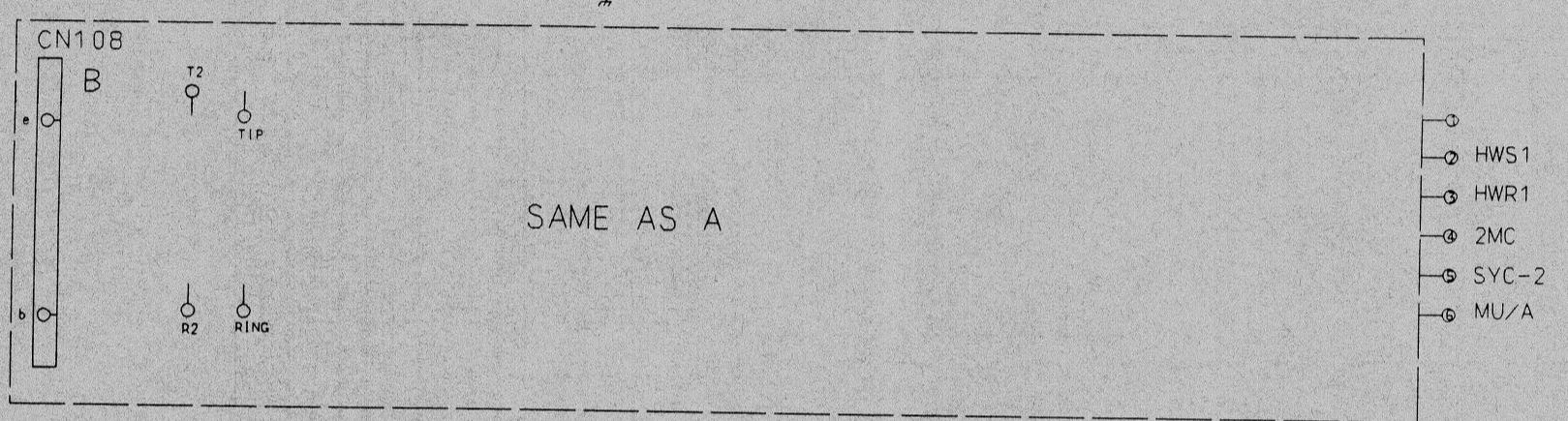
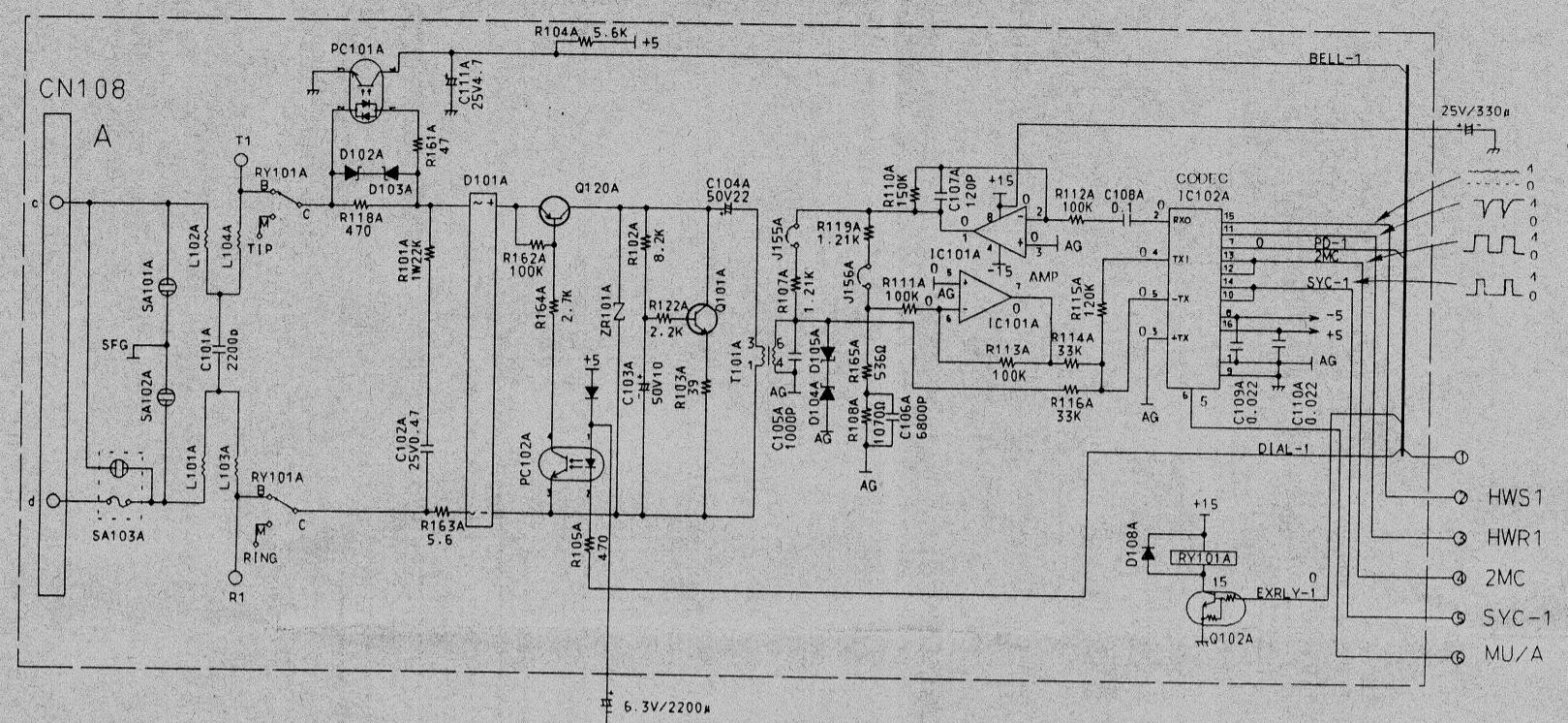




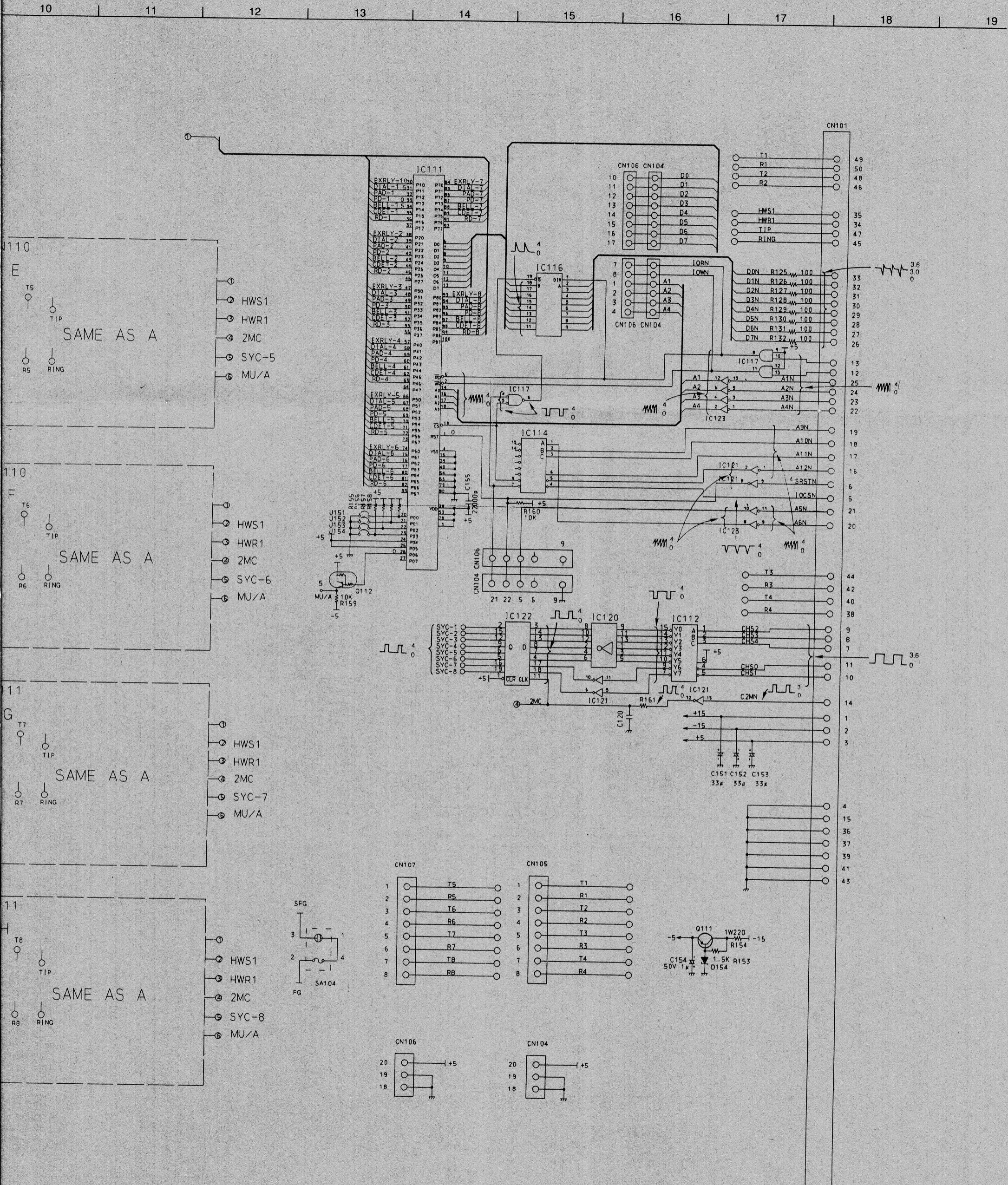


SCHEMATIC DIAGRAM

1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10



GRAM (CO CIRCUIT)

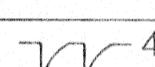


PRINTED CIRCUIT BOARD (CO E)

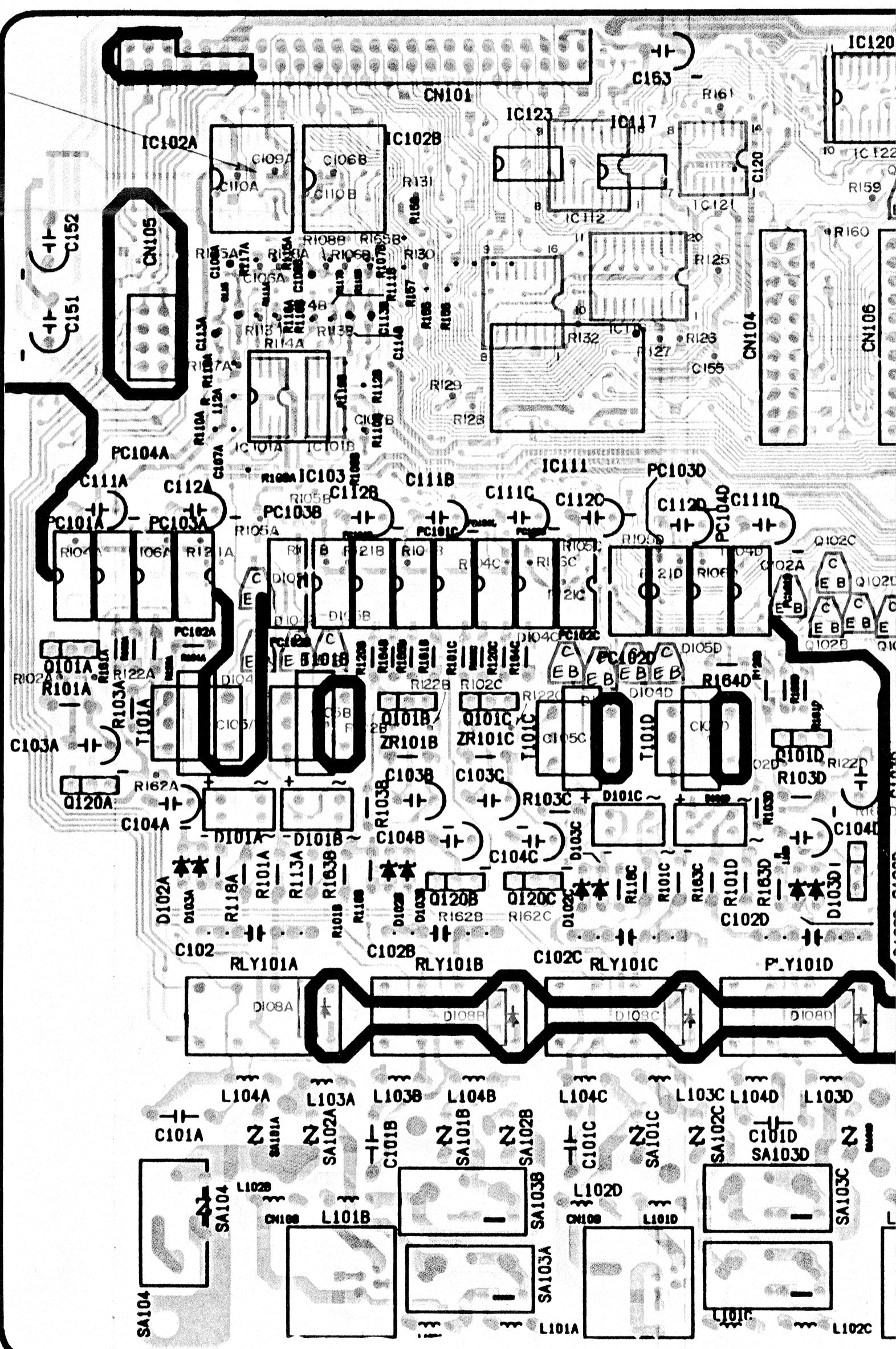
5 | 6 | 7 | 8 | 9 | 10 | 11

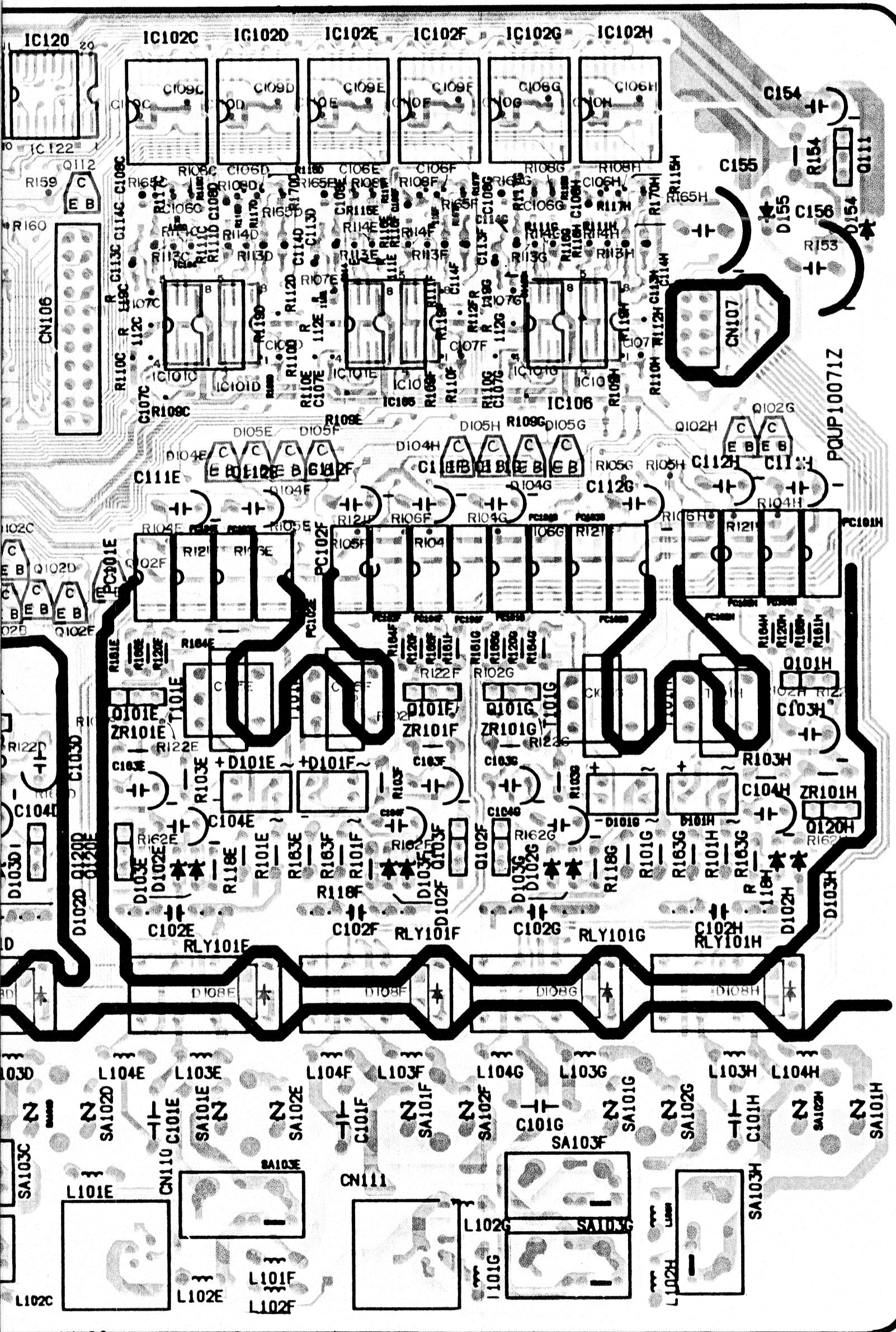
(COMPONENT VIEW)

IC102A

Pin No.	Voltage & Waveform
2-5	0
6	5
7	0
11	 4 0
13	 4 0
14	 4 0
15	 4 0

Value is V.





PRINTED CIRCUIT BOARD

5

6

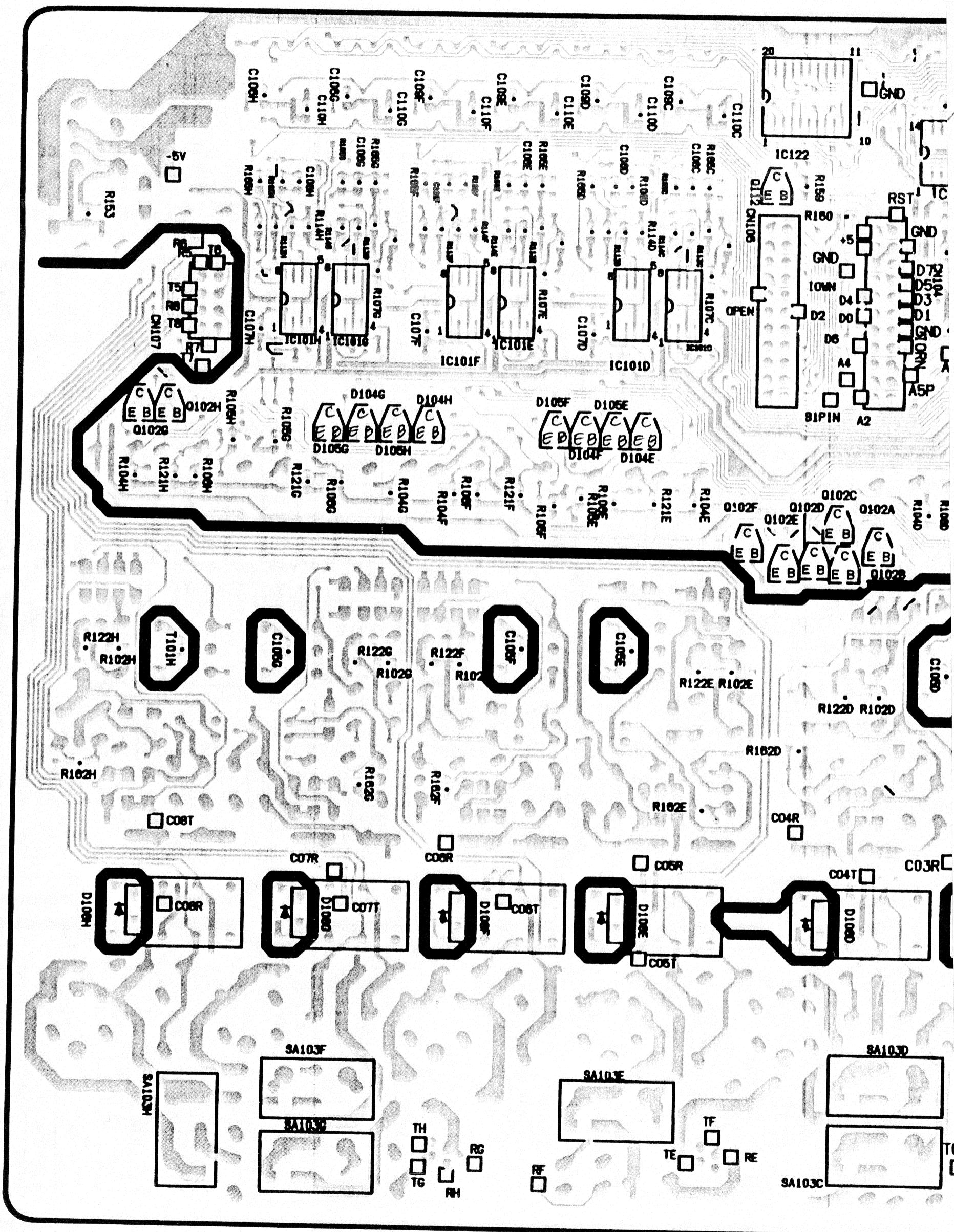
7

8

8

104

(BOTTOM VIEW)



PRINTED CIRCUIT BOARD (CO BOARD)

9

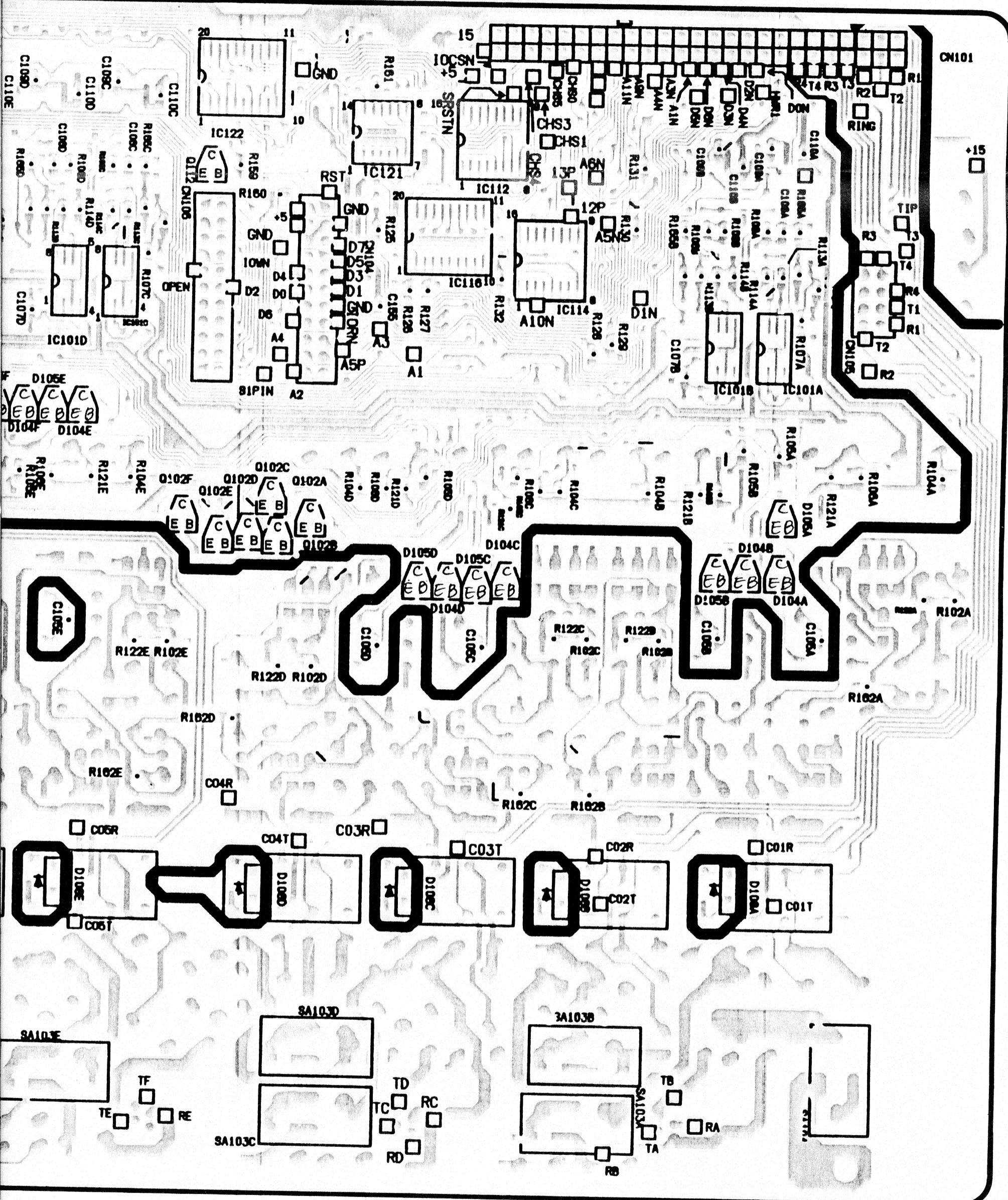
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11

1

270

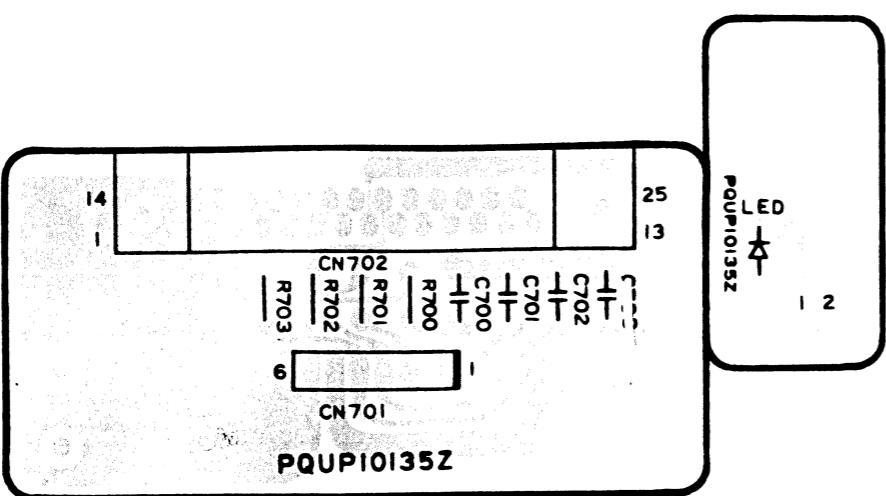
(BOTTOM VIEW)



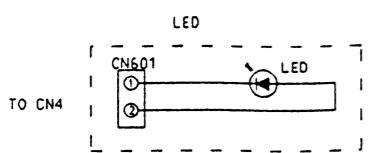
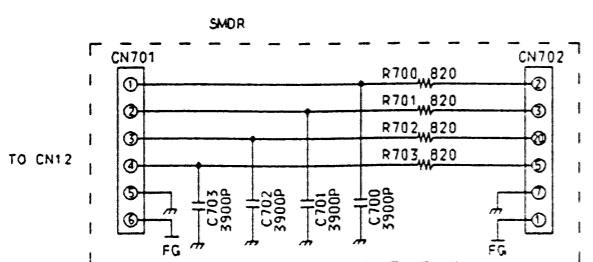
MEMO

PRINTED CIRCUIT BOARD (SMDR/LED)

(COMPONENT VIEW)



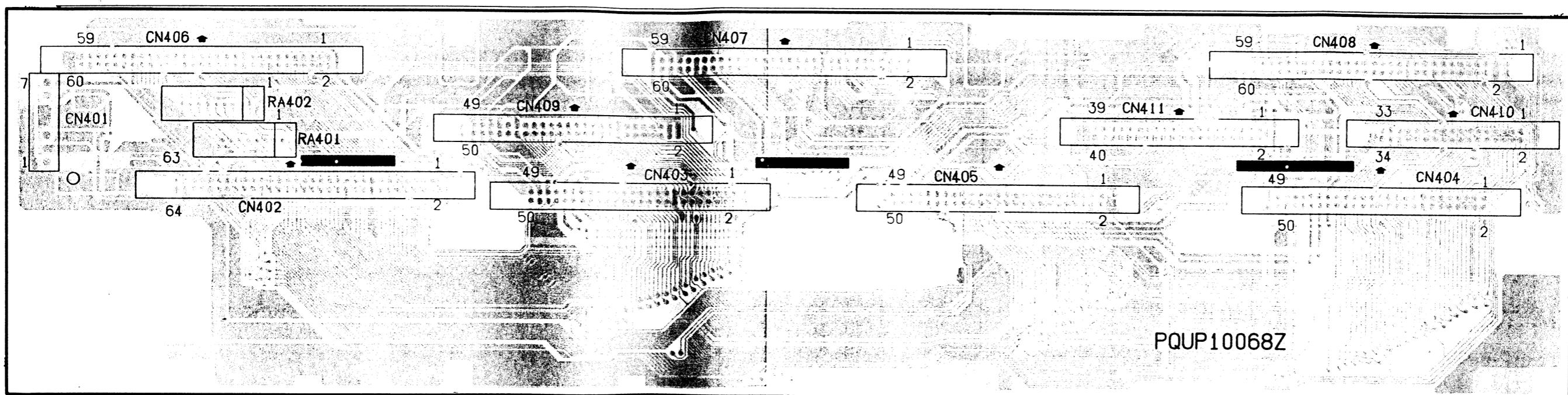
SCHEMATIC DIAGRAM (SMDR/LED)



PRINTED CIRCUIT BOARD (MOTHER BOARD)

1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13

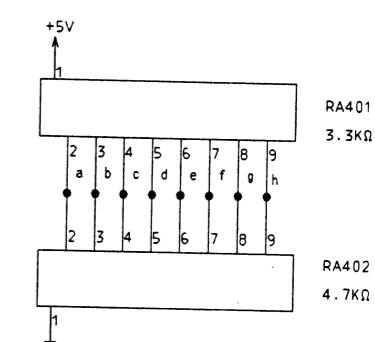
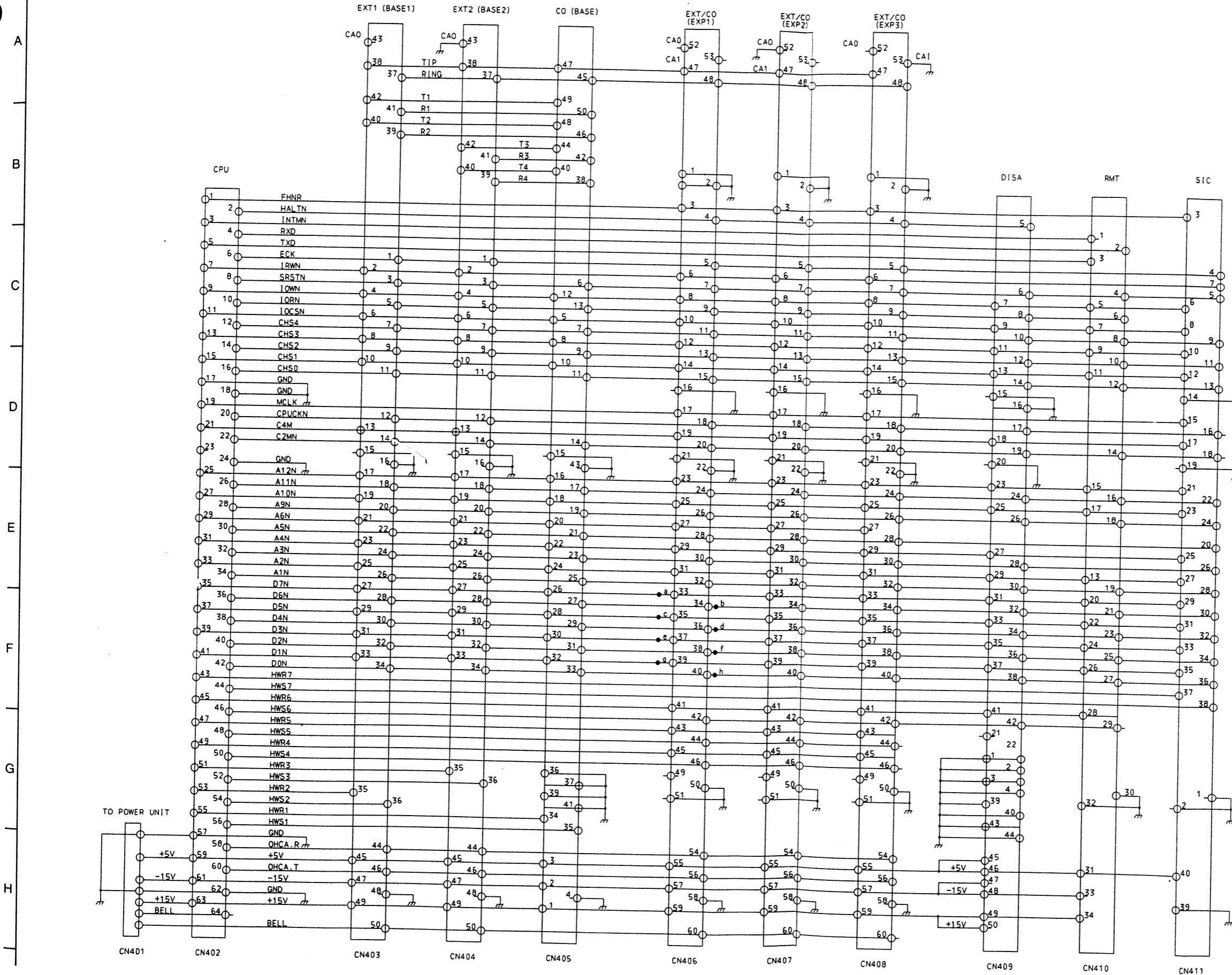
(COMPONENT VIEW)



SCHEMATIC DIAGRAM (MOTHER CIRCUIT)

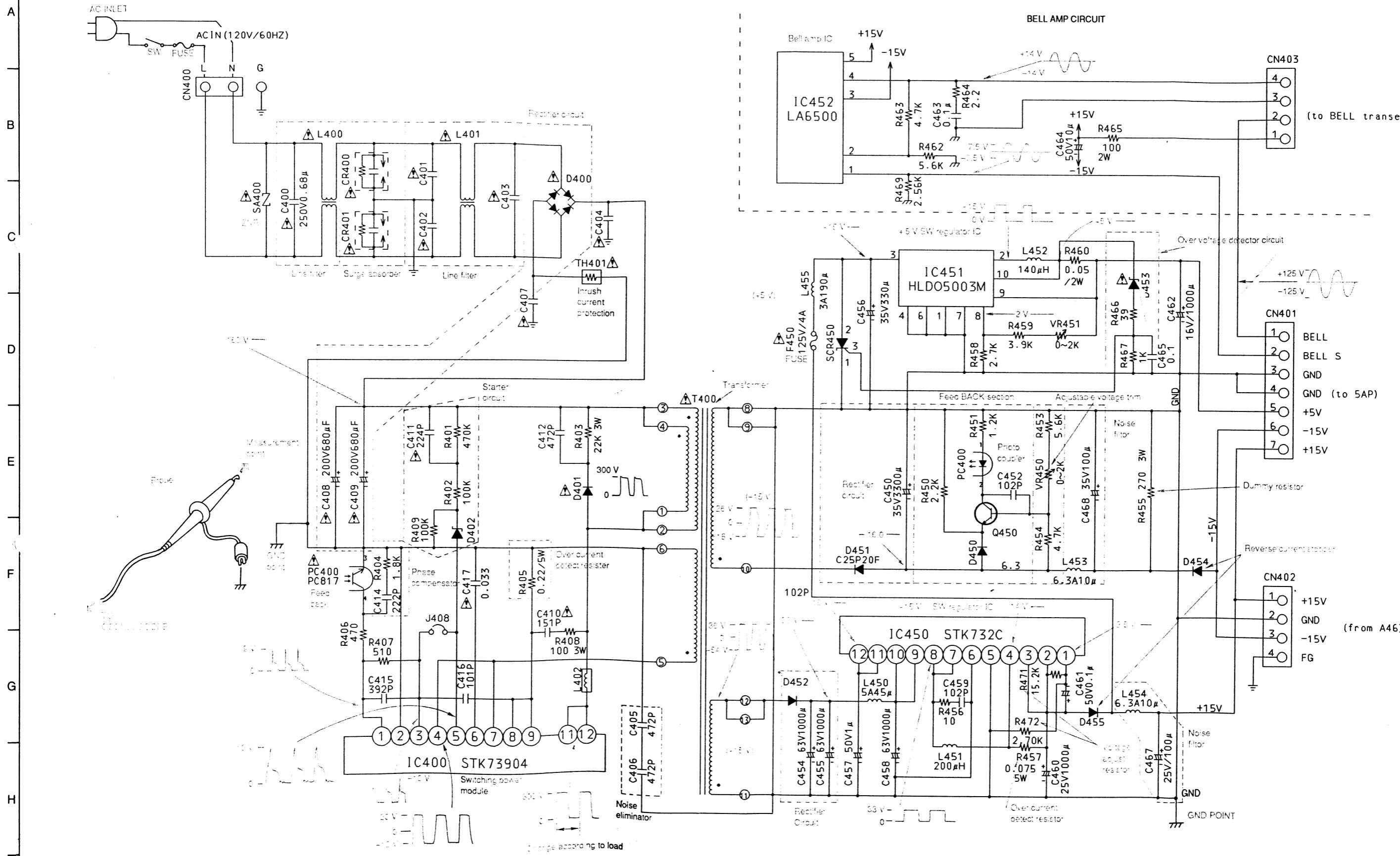
13

1 2 3 4 5 6 7 8 9 10 11 12 13



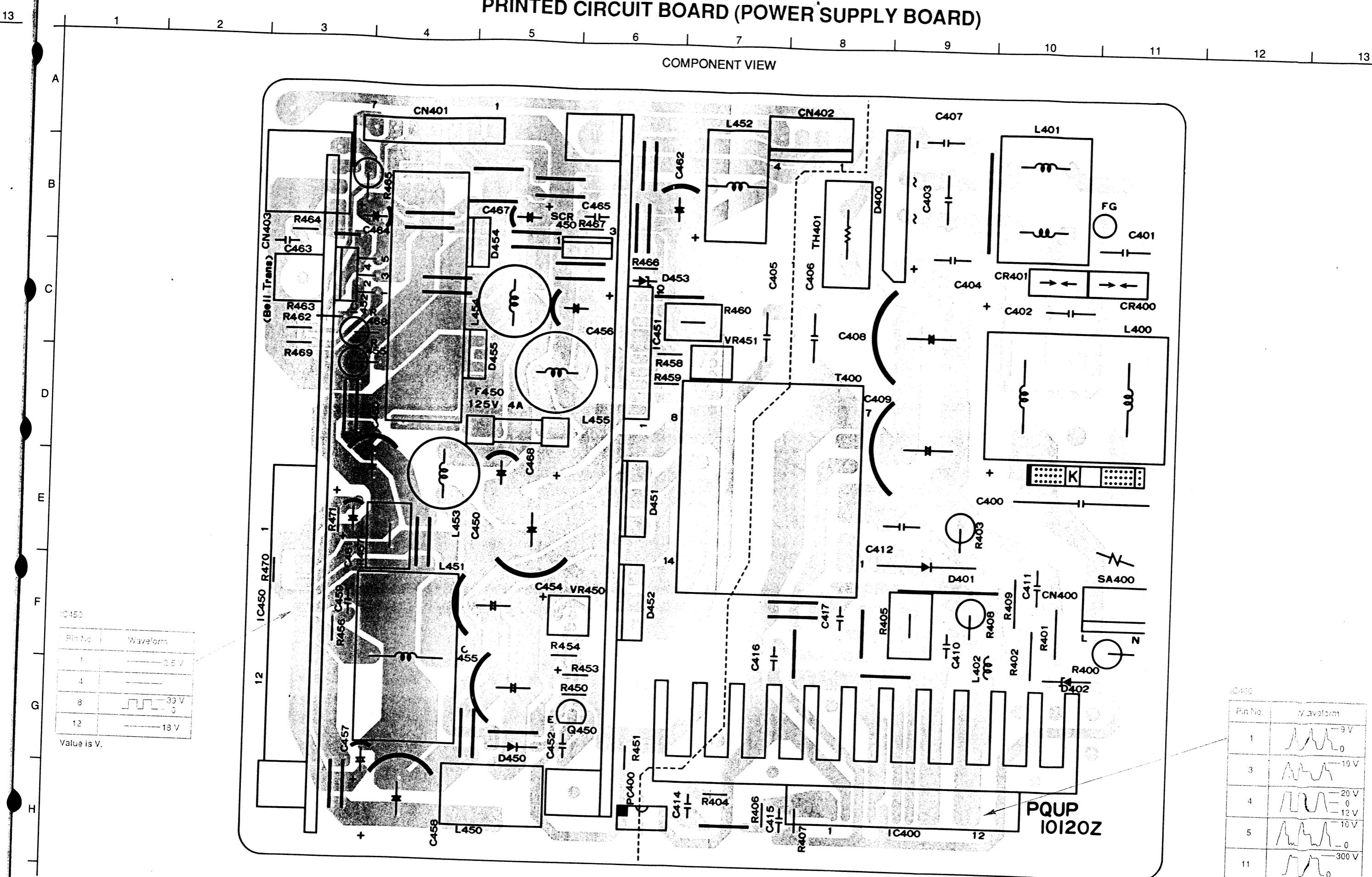
SCHEMATIC DIAGRAM (POWER SUPPLY CIRCUIT)

1 2 3 4 5 6 7 8 9 10 11 12 13

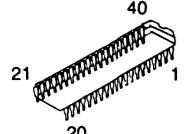
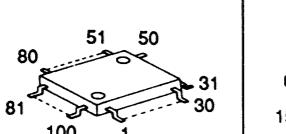
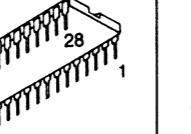
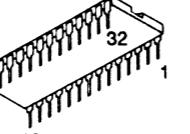
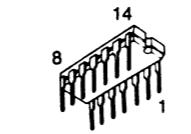
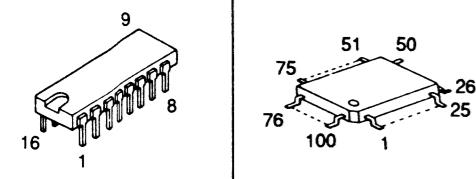
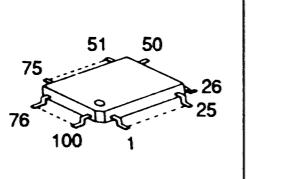
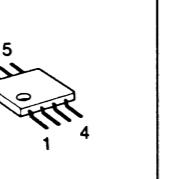
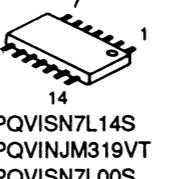
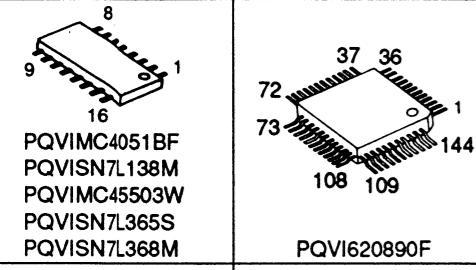
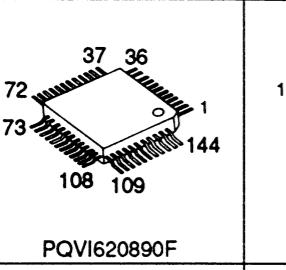
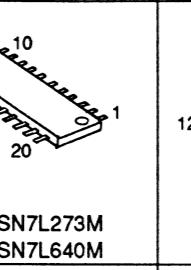
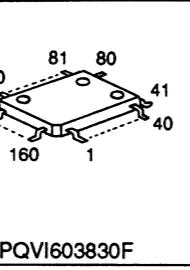
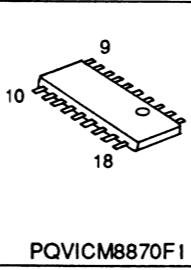
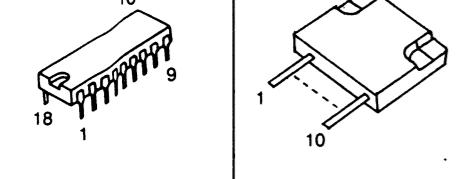
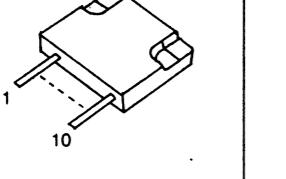
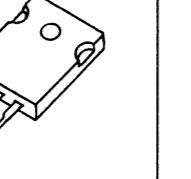
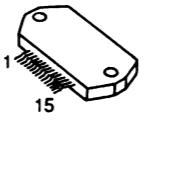
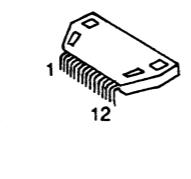
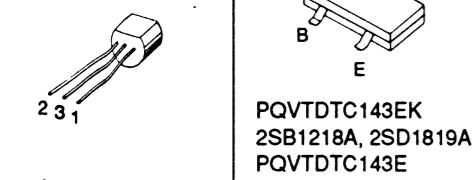
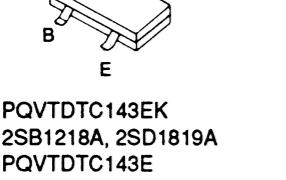
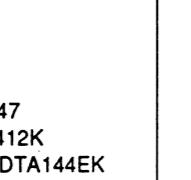
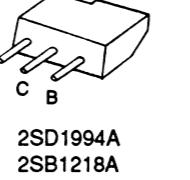
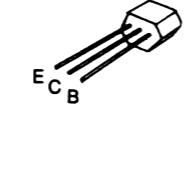
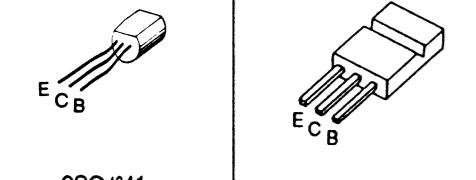
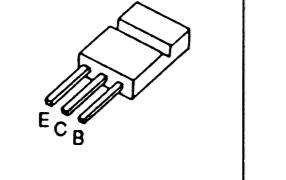
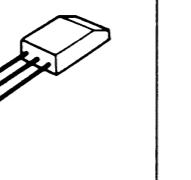
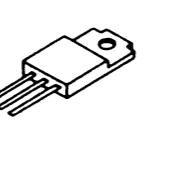
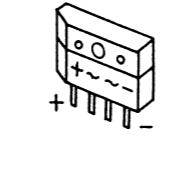
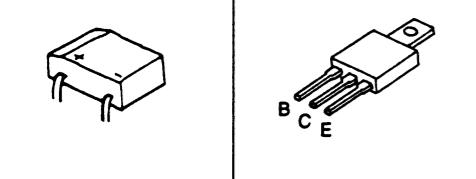
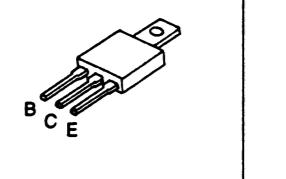
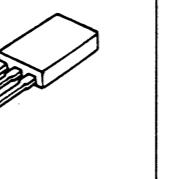
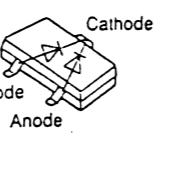
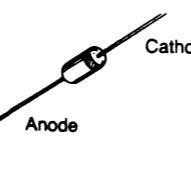

 21
 PQVIN
 2
 16
 PQV
 9
 PQV
 PQV
 PQV
 PQV
 PQV
 18
 PQV
 23
 PQV
 E
 107
 PQV

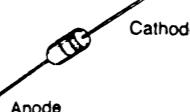
PRINTED CIRCUIT BOARD (POWER SUPPLY BOARD)

COMPONENT VIEW

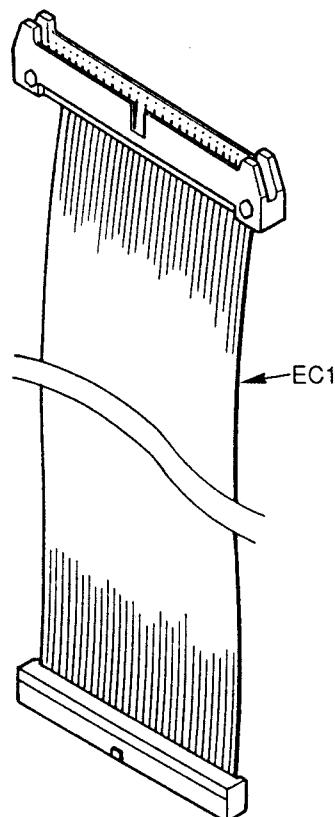


TERMINAL GUIDE OF IC'S, TRANSISTORS AND DIODES

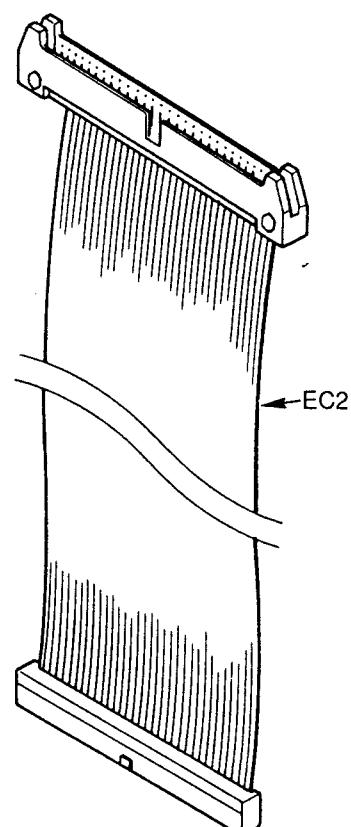
 PQVIMT8980DE	 PQVI63HB110	 PQVIMT8952BE PQVITC5183SD	 PQWI2TD1232C PQWI1D1232C1	 PQVISN7H00S
 PQVIMC45503P	 PQVI68301FCG	 PQVINJM4558M	 PQVISN7L14S PQVINJM319VT PQVISN7L00S PQVIHD75189P PQVIHD75188P	PQVISN7L04S PQVISN7L08S PQVISN7L86S
 PQVIMC4051BF PQVISN7L138M PQVIMC45503W PQVISN7L365S PQVISN7L368M	 PQVI620890F	 PQVISN7L273M PQVISN7L640M	 PQVI603830F	 PQVICM8870F1
 PQVIMS6242BS	 PQVIHLD05003	 PQVDC25P30F	 PQVISTK73904	 PQVISTK732C
 PQVIP520C	 PQVTDT143EK 2SB1218A, 2SD1819A PQVTDT143E UN5113	 MA3047 2SC2412K PQVTDTA144EK 2SA1576	 2SD1994A 2SB1218A 2SB1322	 2SA933
 2SC4641 2SC2878	 2SD2137	 2SA1627	 2SD1897	 PQVDD5SB40
 PQVDS1YB40F1	 PQVILA6500	 PQVDD10SC4M	 MA151WK	 1SS181, MA723

 Anode MA4091, MA4039 MA4057M, MA4030 MA4056	 Anode RLS71	 Anode MA4068 2SC2412K	 Anode PQVDRD6.2FB	 Anode PQVDAK03
 Cathode PQVDHZS2B1	 Cathode PQVDERD3805L			

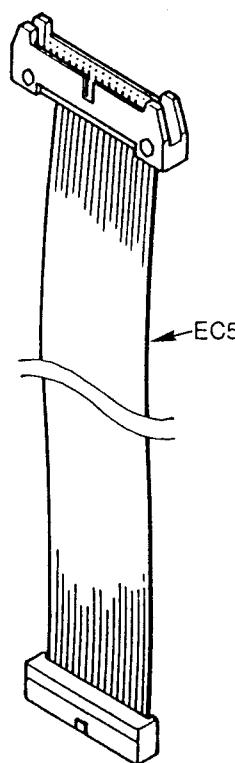
EXTENSION CABLE FOR SERVICING



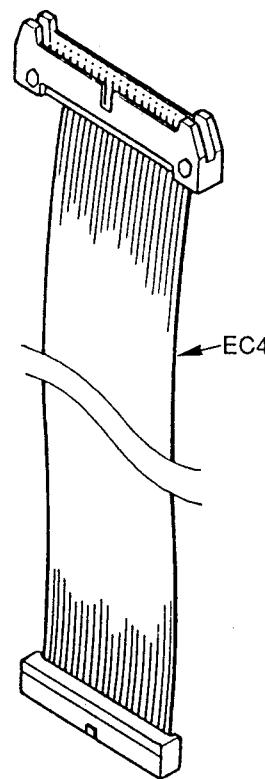
(64 Pin Cord)



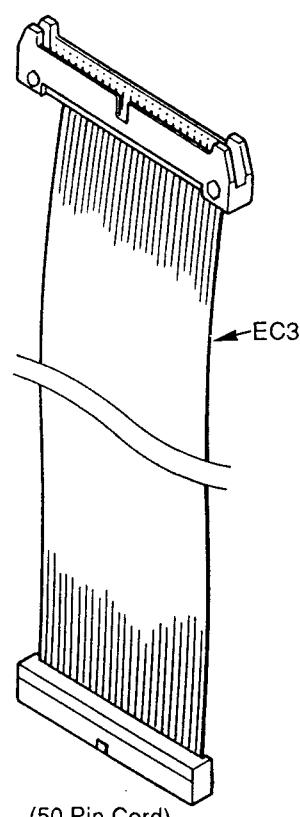
(60 Pin Cord)



(34 Pin Cord)

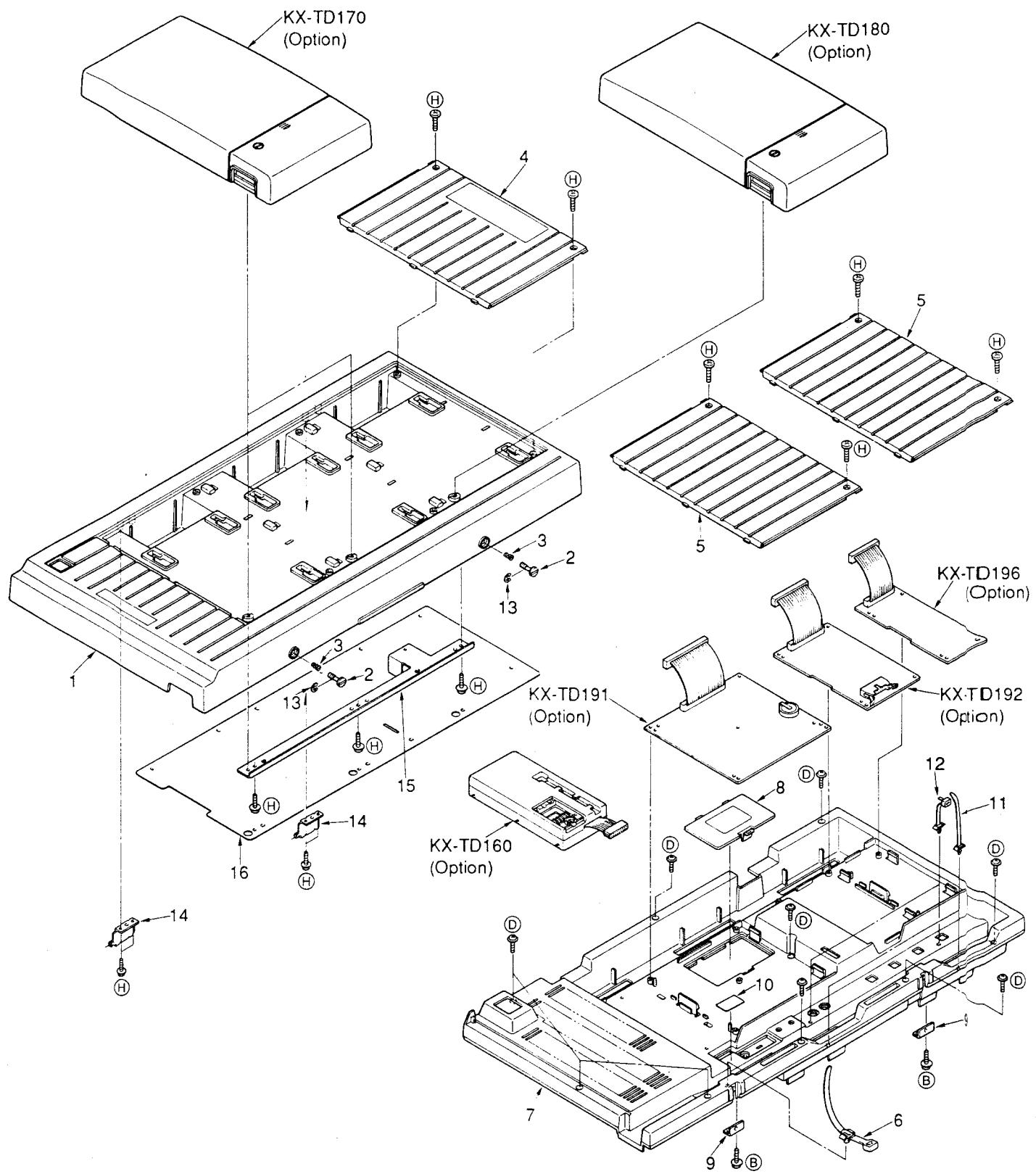


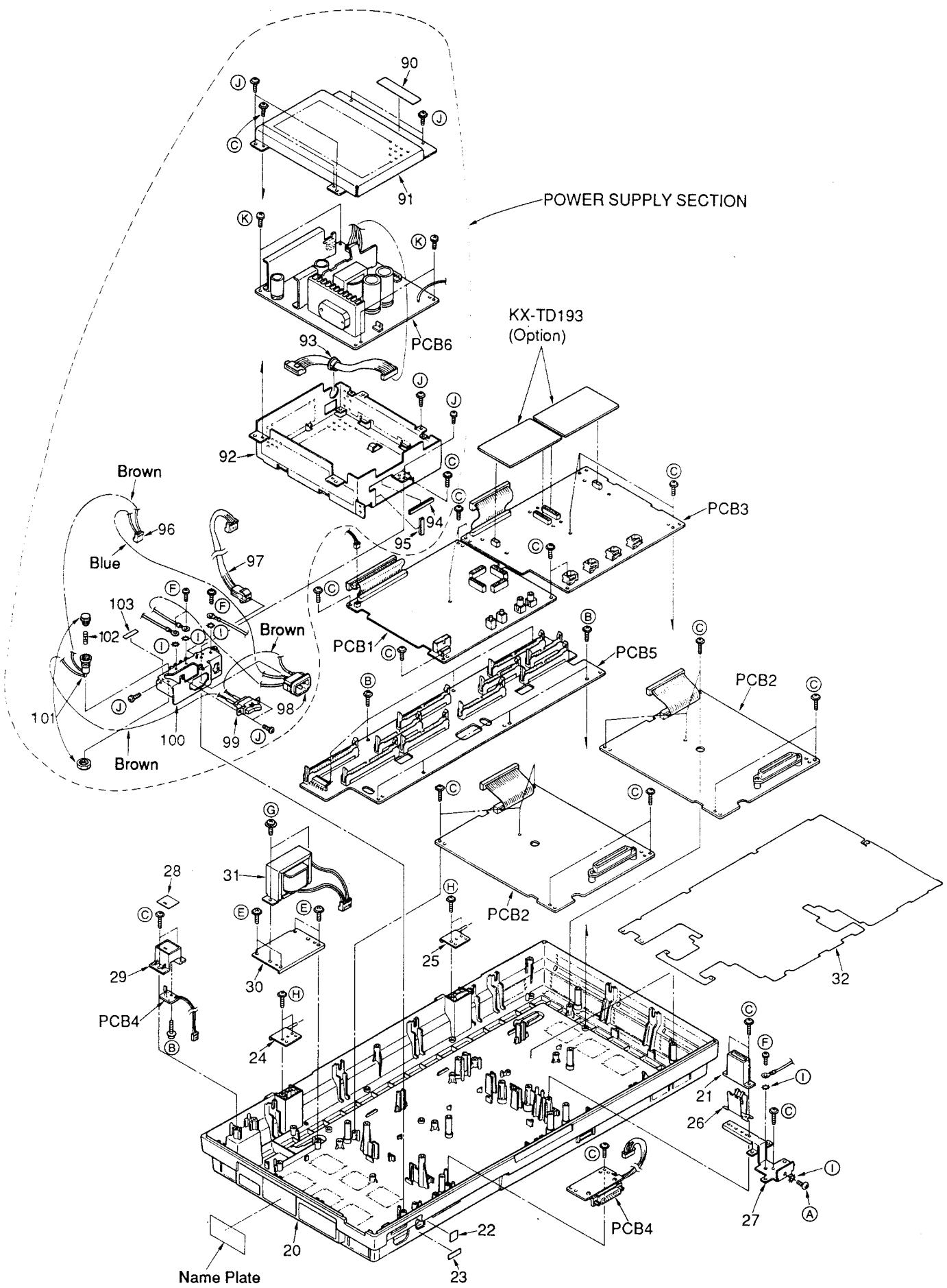
(40 Pin Cord)



(50 Pin Cord)

CABINET AND ELECTRICAL PARTS LOCATION

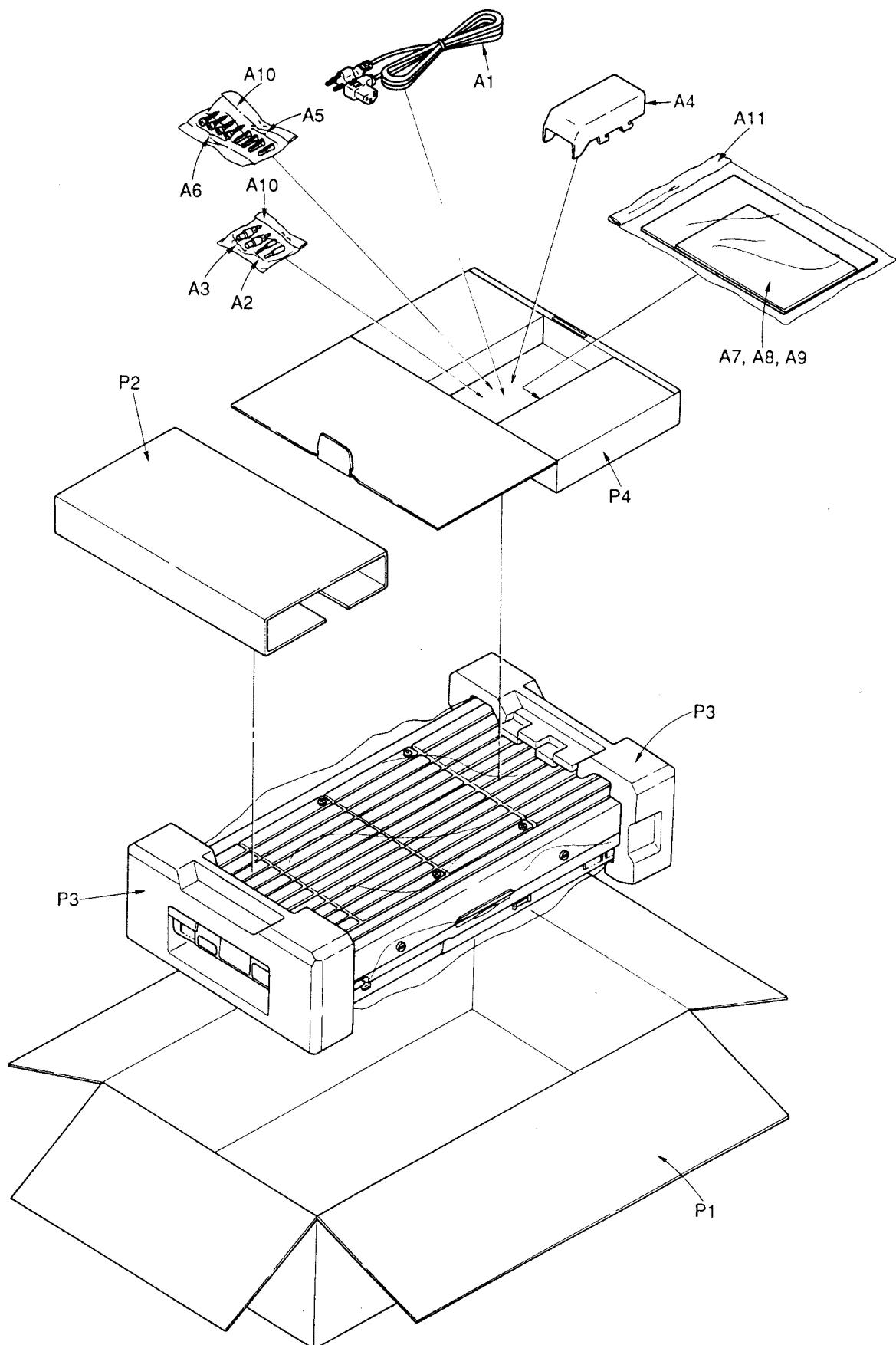




ACTUAL SIZE OF SCREWS AND WASHER

Ref. No.	Part No.	Figure
Ⓐ	XSN4D8FN	
Ⓑ	XTW3+S10P	
Ⓒ	XTW3+S12P	
Ⓓ	XTW3+S14P	
Ⓔ	XTW4+12S	
Ⓕ	XYN4+C8	
Ⓖ	XYN4+F8	
Ⓗ	XTB3+10GFN	
Ⓘ	XWC4B	
Ⓛ	XYN3+C6	
Ⓜ	XYN3+F6	

ACCESSORIES AND PACKING MATERIALS



This replacement parts list is for CANADA version only.

Refer to the simplified manual (cover) for other areas.

REPLACEMENT PARTS LIST

Model KX-TD1232C

Notes:

1. The marking (RTL) indicates that the Retention Time is limited for this item. After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability is dependent on the type of assembly, and in accordance with the laws governing part and product retention. After the end of this period, the assembly will no longer be available.

2. Important safety notice.

Components identified by the mark special characteristics important for safety.

When replacing any of these components, use only manufacturer's specified parts.

3. The S mark indicates service standard parts and may differ from production parts.

4. RESISTORS & CAPACITORS

Unless otherwise specified.

All resistors are in ohms (Ω) $k=1000\Omega$, $M=1000k\Omega$

All capacitors are in MICRO FARADS(μF) $P=\mu\mu F$

*Type & Wattage of Resistor

Type

ERC:Solid	ERX:Metall Film	PORD:Carbon
ERD:Carbon	ERG:Metall Oxide	PQRO:Fuse
PO4R:Chip	ERO:Metall Film	ERF:Wire Wound

Wattage

10,16,18:1/BW	14,25,S2:1/4W	12,50,S1:1/2W	1:1W	2:2W	5:5W
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*Type & Voltage of Capacitor

Type

ECCF:D:semi-Conductor	ECCD,ECKD,POCBC,POVP : Ceramic
ECOS:Styrol	ECQM,ECQV,ECQE,ECQU,ECQB : Polyester
POCBX,ECUV:Chip	ECEA,ECSZ,ECOS : Electrolytic
ECMS:Mica	ECQP : Polypropylene

Voltage

ECQ Type	ECOG ECQV Type	ECSZ Type	Others		
1H: 50V	05:50V	OF:3.15V	OJ : 6.3V	1V : 35V	
2A:100V	1:100V	1A:10V	1A : 10V	50,1H:50V	
2E:250V	2:200V	1V:35V	1C : 16V	1J : 63V	
2H:500V		OJ:6.3V	1E:25.25V	2A : 100V	

Ref. No.	Part No.	Part Name & Description	Pcs
CABINET & ELECTRICAL PARTS			
1	PQKE10002Z1	TOP COVER	1
2	POHD10011Z	SCREW	2
3	PQUS141Z	COIL SPRING	2
4	PQKV10006Z1	COVER-A, FRONT	1
5	PQKV10005Z1	COVER-B, FRONT	2
6	POHR10031Z	CLAMPER-A	1
7	PQKF10018Z1	INSIDE COVER	1
8	PQKK10018Y1	LID, ROM	1
9	PQMH10008Z	ANGLE, FRONT COVER	2
10	PQQT10125Z	CAUTION LABEL-A	1
11	PQHR10028Z	CLAMPER-B	2
12	PQHR10029Z	CLAMPER-C	2
13	XUC3VW	E-RING	2
14	PQMH10009Z	HINGE-A	2
15	PQMC10010Z	ANGLE, FG (TOP COVER)	1
16	PQMC10064Z	SHEET, TOP COVER	1
20	PQKM10021Z1	CABINET BODY	1
21	PQHR10032Z	COVER, FG SPRING	1
22	PQQT10470Z	CAUTION LABEL-B	1
23	PQQT10126Z	CAUTION LABEL-C	1
24	PQMH10010Y	HINGE-B	1
25	PQMH10010Z	HINGE-C	1
26	PQMH10007Z	SPRING, FG	1
27	PQMC10009Z	ANGLE, FG (CABINET BODY)	1
28	PQGP10009Z1	PANEL, LED	1
29	PQGG10009Z1	GRILLE, LED	1
30	PQMH10026Z	FRAME, BELL TRANSFORMER	1
31	PQLT1U9M1A	BELL TRANSFORMER	1
32	PQMC10063Z	SHEET, CABINET BODY	1
A1	PQJA10016Z	AC CORD	1
A2	PQJP1E1Z	PLUG	2
A3	PQJP1E2Z	PLUG	2
A4	PQHR10113Z1	COVER, TEL CORD	1
A5	PQHE10Z	MOUNTING BRACKET (CURL PLUG)	4
A6	PQHE5008Z	MOUNTING BRACKET (SCREW)	4
A7	PQQX10191Z	INSTRUCTION BOOK (ENGLISH)	1
A8	PQQX10192Z	INSTRUCTION BOOK (FRENCH)	1
A9	PQQX10193Z	PRINTED MATTER(TEMPLATE)	1
A10	XZB05X08A03	PROTECTION COVER (SCREW etc)	2
A11	XZB23X35A01	PROTECTION COVER (DOCUMENTS)	1
P1	PQPK10095Z	PACKING CASE	1
P2	PQPD10045Z	CUSHION, TOP	1
P3	PQPN10196Z	CUSHION, L/R	2
P4	PQPN10191Z	ACCESSORY BOX	1
CPU BOARD PARTS			
PCB1	PQWP1TD1232C	CPU BOARD ASS'Y (RTL)	1
IC 1	PQVI68301FCG	(ICs)	
IC 2	PQVI620890F	IC	1
IC 3	PQVIMT8980DE	IC	1
IC 6~8	PQVIMC45503P	IC	3
IC10~12	PQVINJM4558D	IC	5
,14, 27			
IC13	PQVIP520C	IC	1
IC15	PQVIHD75188P	IC	S 1
IC16	PQVIHD75189P	IC	S 1
IC17	PQVISN7H00S	IC	S 1
IC18	PQVISN7L00S	IC	1
IC19	PQWI2TD1232C	IC (ROM)	1
IC20, 21	PQWI1D1232C1	IC (ROM PACK)	1
IC22, 23	PQVTC5183SD	IC	2
IC24, 25	PQVIMB84256D	IC	S 2
IC26	PQVIMS6242BS	IC	S 2
IC29	PQVISN7L368M	IC	1
IC31	PQVISN7L640M	IC	1
IC32	PQVISN7L365S	IC	1
IC33, 34	PQVISN7L368M	IC	2
IC35	PQVISN7L365S	IC	1
Q 5	PQVTDTA144EK	(TRANSISTORS)	
Q 6	2SC2412K	TRANSISTOR(SI)	1
Q 7	2SC2412K	TRANSISTOR(SI)	1
Q 8	PQVTDTA143E	TRANSISTOR(SI)	1
Q 9	PQVTDTA144E	TRANSISTOR(SI)	1
Q 10	2SA933	TRANSISTOR(SI) (or 2SA1317)	1
Q 11	2SC2412K	TRANSISTOR(SI)	1
Q 12	2SC2878	TRANSISTOR(SI)	1
Q 13	2SC2412K	TRANSISTOR(SI)	1
Q 14	2SC2878	TRANSISTOR(SI)	1
D1	MA4091	(DIODES)	
D4	PQVDAK03	DIODE(SI)	2
D7~10	MA4068	DIODE(SI)	4
D11, 12	RLS71	DIODE(SI)	2
D13, 14	MA4030	DIODE(SI)	2
D15	MA4056	DIODE(SI)	1
D16, 17	RLS71	DIODE(SI)	2
D3, 20,	MA723	DIODE(SI)	3
D21		(RESISTORS)	
R 4	PQ4R10XJ471	470	1
R 5	PQ4R10XJ472	4.7K	1
R 6	PQ4R10XJ223	22K	1
R 7	PQ4R10XJ103	10K	1
R 8	PQ4R10XJ683	68K	1
R 9	PQ4R10XJ124	120K	1

This replacement parts list is for CANADA version only.

Refer to the simplified manual (cover) for other areas.

Ref. No.	Part No.	Value	Pcs	Ref. No.	Part No.	Value	Pcs
R12	PQ4R10XJ393	39K	1	R113	PQ4R10XJ103	10K	1
R13	PQ4R10XF1782	17.8K	1	R114	PQ4R10XJ103	10K	1
R14	PQ4R10XJ104	100K	1	R115	PQ4R10XJ222	2.2K	1
R15	PQ4R10XJ103	10K	1	R116	PQ4R10XJ472	4.7K	1
R16	PQ4R10XJ274	270K	1	R117	PQ4R10XJ103	10K	1
R17	PQ4R10XJ183	18K	1	R118	PQ4R10XJ333	33K	1
R18	PQ4R10XJ103	10K	1	R119	PQ4R10XJ103	10K	1
R19	PQ4R10XJ561	560	1	R120	PQ4R10XJ334	330K	1
R20	PQ4R10XJ105	1M	1	R121	PQ4R10XJ222	2.2K	1
R21	PQ4R10XJ563	56K	1	R122	PQ4R10XJ472	4.7K	1
R22	PQ4R10XJ104	100K	1	R123	PQ4R10XJ103	10K	1
R23	PQ4R10XJ104	100K	1	R124	PQ4R10XJ333	33K	1
R24	PQ4R10XJ124	120K	1	R125	PQ4R10XJ103	10K	1
R25	PQ4R10XJ823	82K	1	R126	PQ4R10XJ334	330K	1
R26	PQ4R10XJ104	100K	1	R127	PQ4R10XJ472	4.7K	1
R27	PQ4R10XJ104	100K	1	R128	PQ4R10XJ472	4.7K	1
R28	PQ4R10XF1211	1.21K	1	R129	PQ4R10XJ470	47	1
R29	PQ4R10XF1211	1.21K	1	R130	PQ4R10XJ470	47	1
R30	PQ4R10XJ224	220K	1	R131	PQ4R10XJ470	47	1
R31	PQ4R10XF1401	1.4K	1	R132	PQ4R10XJ470	47	1
R32	PQ4R10XJ823	82K	1	R133	PQ4R10XJ470	47	1
R33	PQ4R10XJ472	4.7K	1	R134	PQ4R10XJ390	39	1
R34	PQ4R10XJ333	33K	1	R135	PQ4R10XJ470	47	1
R35	PQ4R10XJ104	100K	1	R136	PQ4R10XJ470	47	1
R36	PQ4R10XJ124	120K	1	R137	PQ4R10XJ470	47	1
R37	PQ4R10XJ104	100K	1	R138	PQ4R10XJ101	100	1
R38	PQ4R10XJ104	100K	1	R139	PQ4R10XJ101	100	1
R39	PQ4R10XJ124	120K	1	R140	PQ4R10XJ101	100	1
R40	PQ4R10XJ104	100K	1	R141	PQ4R10XJ101	100	1
R48	PQ4R10XJ333	33K	1	R142	PQ4R10XJ101	100	1
R50	PQ4R10XJ224	220K	1	R143	PQ4R10XJ101	100	1
R51	PQ4R10XJ333	33K	1	R144	PQ4R10XJ101	100	1
R52	PQ4R10XJ472	4.7K	1	R145	PQ4R10XJ101	100	1
R53	PQ4R10XJ104	100K	1	R146	PQ4R10XJ470	47	1
R57	PQ4R10XJ102	1K	1	R147	PQ4R10XJ470	47	1
R59	PQ4R10XJ104	100K	1	R148	PQ4R10XJ470	47	1
R149	PQ4R10XJ470	47	1	R149	PQ4R10XJ470	47	1
R61	PQ4R10XJ103	10K	1	R150	PQ4R10XJ470	47	1
R62	PQ4R10XJ223	22K	1	R151	PQ4R10XJ470	47	1
R65	PQ4R10XJ561	560	1	R152	PQ4R10XJ470	47	1
R66	PQ4R10XJ103	10K	1	R153	PQ4R10XJ470	47	1
R67	PQ4R10XJ103	10K	1	R154	PQ4R10XJ470	47	1
R68	PQ4R10XJ103	10K	1	R155	PQ4R10XJ470	47	1
R69	PQ4R10XJ103	10K	1	R156	PQ4R10XJ470	47	1
R70	PQ4R10XJ103	10K	1	R157	PQ4R10XJ470	47	1
R71	PQ4R10XJ103	10K	1	R158	PQ4R10XJ470	47	1
R72	PQ4R10XJ103	10K	1	R159	PQ4R10XJ470	47	1
R73	PQ4R10XJ103	10K	1	R160	PQ4R10XJ470	47	1
R74	PQ4R10XJ103	10K	1	R161	PQ4R10XJ390	39	1
R75	PQ4R10XJ103	10K	1	R162	PQ4R10XJ390	39	1
R76	PQ4R10XJ103	10K	1	R163	PQ4R10XJ560	56	1
R77	PQ4R10XJ103	10K	1	R164	PQ4R10XJ560	56	1
R78	PQ4R10XJ103	10K	1	R165	PQ4R10XJ560	56	1
R79	PQ4R10XJ103	10K	1	R166	PQ4R10XJ560	56	1
R83	ERDS1TJ151	150	1	R167	PQ4R10XJ560	56	1
R84	PQ4R10XJ152	1.5K	1	R168	PQ4R10XJ560	56	1
R85	PQ4R10XJ681	680	1	R169	PQ4R10XJ560	56	1
R87	PQ4R10XJ103	10K	1	R170	PQ4R10XJ560	56	1
R91	PQ4R10XJ103	10K	1	R171	PQ4R10XJ560	56	1
R92	PQ4R10XJ103	10K	1	R172	PQ4R10XJ560	56	1
R93	PQ4R10XJ103	10K	1	R173	PQ4R10XJ560	56	1
R94	PQ4R10XJ103	10K	1	R174	PQ4R10XJ560	56	1
R96	PQ4R10XJ103	10K	1	R175	PQ4R10XJ560	56	1
R97	PQ4R10XJ103	10K	1	R176	PQ4R10XJ560	56	1
R110	PQ4R10XJ470	47	1	R177	PQ4R10XJ560	56	1
R111	PQ4R10XJ470	47	1	R178	PQ4R10XJ560	56	1
R112	PQ4R10XJ470	47	1	R179	PQ4R10XJ560	56	1
				R180	PQ4R10XJ560	56	1
				R181	PQ4R10XJ560	56	1

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Ref. No.	Part No.	Value	Pcs	Ref. No.	Part No.	Value, Part Name & Description	Pcs
R181	PQ4R10XJ560	56	1	C33	PQCUV1H223KB	0.022	1
R182	PQ4R10XJ560	56	1	C34	PQCUV1H223KB	0.022	1
R183	PQ4R10XJ560	56	1	C35	PQCUV1H223KB	0.022	1
R184	PQ4R10XJ560	56	1	C36	PQCUV1H223KB	0.022	1
R185	PQ4R10XJ560	56	1	C37	PQCUV1H223KB	0.022	1
R186	PQ4R10XJ560	56	1	C38	PQCUV1H223KB	0.022	1
R187	PQ4R10XJ560	56	1	C39	PQCUV1H200JC	20P	1
R188	PQ4R10XJ560	56	1	C40	PQCUV1H223KB	0.022	1
R189	PQ4R10XJ560	56	1	C41	PQCUV1H223KB	0.022	1
R190	PQ4R10XJ560	56	1	C42	PQCUV1H223KB	0.022	1
R191	PQ4R10XJ560	56	1	C43	PQCUV1H223KB	0.022	1
R192	PQ4R10XJ560	56	1	C44	PQCUV1H223KB	0.022	1
R193	PQ4R10XJ560	56	1	C45	PQCUV1H223KB	0.022	1
R194	PQ4R10XJ560	56	1	C46	PQCUV1H223KB	0.022	1
R195	PQ4R10XJ560	56	1	C47	PQCUV1H223KB	0.022	1
R196	PQ4R10XJ560	56	1	C50	ECEA1EU331	330	1
R197	PQ4R10XJ560	56	1	C53	PQCUV1H180JC	18P	1
R198	PQ4R10XJ560	56	1	C54	PQCUV1H180JC	18P	1
R199	PQ4R10XJ560	56	1	C55	PQCUV1H223KB	0.022	1
R200	PQ4R10XJ560	56	1	C56	PQCUV1H223KB	0.022	1
R201	PQ4R10XJ102	1K	1	C59	ECEA1HU010	1	1
R202	PQ4R10XJ102	1K	1	C60	ECEA1HU010	1	1
R203	PQ4R10XJ102	1K	1	C61	ECEA1HU010	1	1
R204	PQ4R10XJ103	10K	1	C62	ECEA1HU010	1	1
R205	PQ4R10XJ103	10K	1	C63	ECEA1HU010	1	1
R206	PQ4R10XJ103	10K	1	C64	PQCUV1H223KB	0.022	1
R207	PQ4R10XJ103	10K	1	C66	ECEA1AU101	100	1
R208	PQ4R10XJ103	10K	1	C67	PQCUV1H223KB	0.022	1
R209	PQ4R10XJ103	10K	1	C68	PQCUV1H223KB	0.022	1
R210	PQ4R10XJ103	10K	1	C70	PQCUV1H223KB	0.022	1
R211	PQ4R10XJ103	10K	1	C71	PQCUV1H223KB	0.022	1
R212	PQ4R10XJ103	10K	1	C72	PQCUV1H223KB	0.022	1
R213	PQ4R10XJ103	10K	1	C80	PQCUV1H200JC	20P	1
R214	PQ4R10XJ103	10K	1	C81	PQCUV1H223KB	0.022	1
R215	PQ4R10XJ103	10K	1	C82	PQCUV1H223KB	0.022	1
R216	PQ4R10XJ103	10K	1	C83	PQCUV1H223KB	0.022	1
R217	PQ4R10XJ103	10K	1	C84	PQCUV1H223KB	0.022	1
R218	PQ4R10XJ103	10K	1	C85	PQCUV1H223KB	0.022	1
R219	PQ4R10XJ103	10K	1	C86	PQCUV1H104ZF	0.1	1
R220	PQ4R10XJ223	22K	1	C87	ECEA1VU330	33	1
R221	PQ4R10XJ222	2.2K	1	C88	ECEA1HN2R2S	2.2	1
J 5	ERDS2TJ0T	0	1	C89	PQCUV1H104ZF	0.1	1
J 6, 7	PQ4R10XJ000	0	2				
	(CAPACITORS)						
C 1	EECFE5R5474	5.47M	1	C90	ECEA1VU330	33	S 1
C 2	ECEA1EU4R7	4.7	1	C91	ECEA1HN2R2S	2.2	1
C 3	ECEA1HN3R3S	3.3	1	C92	PQCUV1H101JC	100P	1
C 8	ECQV1H104JZ	0.1	1	C93	PQCUV1H101JC	100P	1
C 9	ECQV1H104JZ	0.1	1	C94	PQCUV1H470JC	47P	1
C11	PQCUV1H104ZF	0.1	1	C95	PQCUV1H470JC	47P	1
C12	PQCUV1H101JC	100P	1	C96	PQCUV1H470JC	47P	1
C13	PQCUV1H682KB	0.0068	1	C97	PQCUV1H223KB	0.022	1
C16	PQCUV1H101JC	100P	1	C98	PQCUV1H223KB	0.022	1
C17	PQCUV1H104ZF	0.1	1	C99	PQCUV1H223KB	0.022	1
C19	PQCUV1H101JC	100P	1	T1	ETA14Y180AY	(TRANSFORMERS)	1
C20	PQCUV1H332KB	0.0033	1	T2~5	PQLT2D6A	TRANSFORMER	4
C21	PQCUV1H104ZF	0.1	1			TRANSFORMER	
C22	PQCUV1H101JC	100P	1			(COILS)	
C23	PQCUV1H101JC	100P	1	L7~14	PQLE106	COIL	8
C24	PQCUV1H332KB	0.0033	1	L21~23	PQVFTU50MT	CERAMIC FILTER	3
C25	PQCUV1H104ZF	0.1	1	L24~27	PQVFCM04RC01	CERAMIC FILTER	4
C26	PQCUV1H104ZF	0.1	1			(JACKS)	
C27	PQCUV1H102J	0.001	1	JAC1, 2	PQJJ1G1Z	JACK, PAGING	2
C28	PQCUV1H104ZF	0.1	1	JAC3, 4	PQJJ1D3Z	JACK, EP	2
C29	PQCUV1H101JC	100P	1			(CONNECTORS)	
C30	PQCUV1H104ZF	0.1	1	CN1	PQJS64R15Z	CONNECTOR, 64P	1
C31	PQCUV1H102J	0.001	1	CN4	PQJP2D70Z	CONNECTOR, 2P	1

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Ref. No.	Part No.	Part Name & Description	Pcs	Ref. No.	Part No.	Value, Part Name & Description	Pcs
CN9	PQJP20A08Z	CONNECTOR, 20P	1	D203A	RLS71	(DIODES)	
CN12	PQJP6D70Z	CONNECTOR, 6P	1	D204A~	RLS71	DIODE(SI)	1
BAT	CR2354-1HF	(BATTERY) LITHIUM BATTERY	1	D204H	RLS71	DIODE(SI)	8
SW1	EVQ21409K	(SWITCHES)	1	D205A~	RLS71	DIODE(SI)	8
SW2	PQSS2A24Z	SWITCH	1	D205H	RLS71	DIODE(SI)	8
SW3	ESD11V120	SWITCH	1	D206A~	RLS71	DIODE(SI)	8
X1	PQVCJ8192N8Z	(CRYSTAL OSCILLATORS)	1	D206H	RLS71	DIODE(SI)	8
X2	PQVCL3276N6Z	CRYSTAL OSCILLATOR	1	D207A~	RLS71	DIODE(SI)	8
Z1, 2, 4~6	PQRSLD8X103J	CRYSTAL OSCILLATOR (COMPONENTS COMBINATIONS) RESISTOR ARRAY	5	D207H	RLS71	DIODE(SI)	8
EXTENSION BOARD PARTS				D210A~	RLS71	DIODE(SI)	8
PCB2	PQWP2TD1232C	EXTENSION BOARD ASS'Y (RTL)	1	D210H	RLS71	DIODE(SI)	8
IC201A~	PQVIMC45503W	(ICs)		D211A~	MA4039	DIODE(SI)	8
IC201H		IC	8	D211H	MA151WK	DIODE(SI) (or 1SS184)	S
IC202A~	PQVINJM4558M	IC	8	D212A	MA151WK	DIODE(SI) (or 1SS184)	8
IC202H				D212H	1SS181	DIODE(SI)	8
IC203A~	PQVINJM319VT	IC	8	D213A~	1SS181	DIODE(SI)	8
IC203H				D213H			
IC211	PQVI603830F	IC	1	D214A~	RLS71	DIODE(SI)	8
IC213	PQVIMT8952BE	IC	1	D214H	RLS71	DIODE(SI)	8
IC215	PQVICM8870FI	IC		D220	RLS71	DIODE(SI)	1
IC216	PQVICM8870FI	IC		D221	RLS71	DIODE(SI)	1
IC217	PQVIMC4051BF	IC		D223	RLS71	DIODE(SI)	1
IC218	PQVIMC4051BF	IC		D225	RLS71	DIODE(SI)	1
IC219	PQVISN7L14S	IC		D251	MA4056	DIODE(SI)	1
IC220	PQVISN7L14S	IC		D252	RLS71	DIODE(SI)	1
IC221	PQVISN7L14S	IC		R200A~	PQ4R10XJ330	(RESISTORS)	
IC222	PQVISN7L365S	IC		R200H	33		8
IC223	PQVISN7L86S	IC		R201A~	PQ4R10XJ222	2.2K	8
IC224	PQVISN7L640M	IC		R201H			
		(TRANSISTORS)		R202A~	PQ4R10XJ222	2.2K	8
Q200A~	2SB1218A	TRANSISTOR(SI)		R202H			
Q200D		(or 2SA1576R)		R203	PQ4R10XJ101	100	1
Q200E~	2SD1819A	TRANSISTOR(SI)		R204	PQ4R10XJ105	1M	1
Q200H		(or 2SA4081R)		R205A~	ERDS2TJ220	22	8
Q201A~	2SA1576	TRANSISTOR(SI)		R205H			
Q201D,				R206A~	ERDS2TJ680	68	8
Q201F~				R206H			
Q201H				R207A~	PQ4R10XJ682	6.8K	8
Q201E	2SB1218A	TRANSISTOR(SI)		R207H			
		(or 2SA1576R)		R208A~	ERDS2TJ220	22	8
Q203A~	2SB1322	TRANSISTOR(SI)		R208H			
Q203H				R209A~	ERDS2TJ680	68	8
Q204A~	2SD1994A	TRANSISTOR(SI)		R209H			
Q204H				R210A	PQ4R10XJ682	6.8K	8
Q205A~	2SD1819A	TRANSISTOR(SI)		R210H			
Q205H		(or 2SC4081R)		R211A~	PQ4R10XF3000	300	8
Q206A~	2SD1819A	TRANSISTOR(SI)		R211H			
Q206H		(or 2SC4081R)		R212A~	PQ4R10XF2940	294	8
Q207A~	PQVTDT143E	TRANSISTOR(SI)		R212H			
Q207H				R213A~	PQ4R10XF3000	300	8
Q208A~	2SB1218A	TRANSISTOR(SI)		R213H			
Q208H		(or 2SA1576R)		R214A~	PQ4R10XF7502	75K	8
Q210	2SD2137	TRANSISTOR(SI)	1	R214H			
Q211	UN5113	TRANSISTOR(SI)	1	R215A~	PQ4R10XF1003	100K	8
Q213	2SD1819A	TRANSISTOR(SI) (or 2SC4081R)	1	R215H			
Q214	UN5213	TRANSISTOR(SI)	1	R216A~	PQ4R10XF4702	47K	8
Q215	2SD2137	TRANSISTOR(SI)	1	R216H			
Q220A	UN5213	TRANSISTOR(SI)	1	R217A~	PQ4R10XF4702	47K	8
Q221	PQVTDT143E	TRANSISTOR(SI)	1	R217H			
Q251	2SB1322	TRANSISTOR(SI) (or 2SB1237R)	1	R218A~	PQ4R10XF1003	100K	8
Q252	UN5113	TRANSISTOR(SI)	1	R218H			
				R219A~	PQ4R10XF1003	100K	8
				R219H			
				R220A~	PQ4R10XF1003	100K	8
				R220H			
				R221A~	PQ4R10XF1003	100K	8
				R221H			
				R222A~	PQ4R10XF3000	300	8
				R222H			

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Ref. No.	Part No.	Value	Pcs	Ref. No.	Part No.	Value	Pcs
R223A~	PQ4R10XF7502	75K	8	R274	Not Used		
R223H				R275A~	PQ4R10XJ563	56K	8
R224A~	PQ4R10XJ153	15K	8	R275H	PQ4R10XJ560	56	8
R224H				R276A~	PQ4R10XJ560	56	8
R225A~	PQ4R10XJ333	33K	8	R276H	PQ4R10XJ560	56	8
R225H				R277A~	PQ4R10XJ560	56	8
R226A~	PQ4R10XJ103	10K	8	R277H	PQ4R10XJ560	56	8
R226H				R278A~	PQ4R10XJ560	56	8
R227A~	PQ4R10XJ473	47K	8	R278H	PQ4R10XJ560	56	8
R227H				R279A~	PQ4R10XJ560	56	8
R228A~	PQ4R10XJ123	12K	8	R279H			
R228H				R280	PQ4R10XJ223	22K	1
R229A~	PQ4R10XJ333	33K	8	R285	PQ4R10XJ122	1.2K	1
R229H				R286	PQ4R10XJ152	1.5K	1
R230A~	PQ4R10XJ103	10K	8	R290A~	PQ4R10XJ472	4.7K	8
R230H				R290H			
R231A~	PQ4R10XJ102	1K	8	R291A~	PQ4R10XJ472	4.7K	8
R231H				R291H			
R232A~	PQRD2TJ102	1K	8	R292A~	PQ4R10XJ472	4.7K	8
R232H				R292H			
R233A~	PQ4R10XJ1R8	1.8	8	R293	PQ4R10XF6801	6.8K	1
R233H				R294	PQ4R10XF1201	1.2K	1
R234A~	PQ4R10XJ472	4.7K	8	R295A~	PQ4R10XJ101	100	8
R234H				R295H			
R235A~	PQ4R10XJ472	4.7K	8	R296A~	PQ4R10XJ220	22	8
R235H				R296H			
R236A~	PQ4R10XJ472	4.7K	8	R297A~	PQ4R10XJ220	22	8
R236H				R297H			
R237A~	PQ4R10XJ472	4.7K	8	R299A~	PQ4R10XJ101	100	8
R237A~	PQ4R10XJ472	4.7K	8	R299H			
R238A~	PQ4R10XJ330	33	8	J201~	PQ4R10XJ000	0	8
R238H				J204			
R239A~	PQ4R10XJ222	2.2K	8	J251A~	PQ4R10XJ000	0	8
R239H				J251H			
R240A~	PQ4R10XJ222	2.2K	8	J253A~	PQ4R10XJ000	0	8
R240H				J253H			
R241	PQ4R10XJ473	47K	1	J255A~	PQ4R10XJ000	0	8
R242	PQ4R10XJ682	6.8K	1	J255H			
R243	PQ4R10XJ223	22K	1	J257A~	PQ4R10XJ000	0	8
R244	PQ4R10XJ472	4.7K	1	J257H			
R245	PQ4R10XJ153	15K	1	J259A~	PQ4R10XJ000	0	8
R246	PQ4R10XJ152	1.5K	1	J259H			
R247	PQ4R10XJ223	22K	1	C200A~	ECEA1HKS2R2	(CAPACITORS)	
R248A~	PQ4R10XJ471	470	8	C200H			
R248H				C202A~	ECEA1HKS2R2	2.2	8
R251	PQ4R10XJ103	10K	1	C202H			
R252	PQ4R10XJ103	10K	1	C204A~	ECEA1HU100	10	8
R253	PQ4R10XJ103	10K	1	C204H			
R254	PQ4R10XJ103	10K	1	C205A~	ECEA1EN100S	10	8
R255	PQ4R10XJ393	39K	1	C205H			
R256	PQ4R10XJ104	100K	1	C206A~	ECEA1EN100S	10	8
R257	PQ4R10XJ334	330K	1	C206H			
R258	PQ4R10XJ393	39K	1	C207A~	ECEA1HKS3R3	3.3	8
R259	PQ4R10XJ104	100K	1	C207H			
R260	PQ4R10XJ334	330K	1	C208A~	ECUV1H104MD	0.1	8
R261	PQRD1TJ820	82	1	C208H			
R262	PQ4R10XJ152	1.5K	1	C209A~	PQCUV1H104ZF	0.1	8
R263	PQ4R10XJ152	1.5K	1	C209H			
R264	PQ4R10XJ152	1.5K	1	C210A~	PQCUV1H104ZF	0.1	8
R265	PQ4R10XJ103	10K	1	C210H			
R266	PQ4R10XJ103	10K	1	C211A~	ECEA1HN4R7S	4.7	8
R267	PQ4R10XJ101	100	1	C211H			
R268	PQ4R10XJ101	100	1	C212A~	PQCUV1H104ZF	0.1	8
R269	PQ4R10XJ101	100	1	C212H			
R270	ERDS2TJ220	22	1	C213A~	PQCUV1H104ZF	0.1	8
R270A-H	PQ4R10XJ103	10K	8	C213H			
R271	PQ4R10XJ682	6.8K	1	C214	Not Used		8
R272	PQ4R10XJ101	100	1	C215	Not Used		8
R273	PQ4R10XJ103	100K	1				

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Ref. No.	Part No.	Value, Part Name & Description	Pcs	Ref. No.	Part No.	Value, Part Name & Description	Pcs
C216A~ C216H	ECEA1HKS2R2	2.2	8	ZR202A~	PQVDNV039D03	(VARISTORS) VARISTOR	8
C217A~ C217H	PQCUV1H680JC	68P	1	ZR202H	PQVDNV039D03	VARISTOR	8
C218A~ C218H	PQCUV1H680JC	68P	8	ZR203A~	PQVDNV039D03	VARISTOR	8
C219A~ C219H	ECUV1H104MD	0.1	8	ZR203H	PQVDNV039D03	VARISTOR	8
C220	ECEA1EU101	100	1	ZR204A~	PQVDNV039D03	VARISTOR	8
C220A~ C220H	ECUV1H393KB	0.039	8	ZR204H	PQVDNV039D03	VARISTOR	8
C221	ECEA1EU101	100	1	ZR205A~	PQVDNV039D03	VARISTOR	8
C222A~ C222H	ECEA1HU100	10	8	ZR205H	PQVBFC3584A1	(CERAMIC RESONATOR) CERAMIC RESONATOR	1
CO LINE BOARD PARTS							
C251~ C254	PQCUV1H223KB	0.022	4	PCB3	PQWP3TD1232C	CO LINE BOARD ASS'Y (RTL)	1
C255	ECEA1VU330	33	S 1	IC101A~	PQVINJM4558M	(ICs)	8
C256	PQCUV1H221JC	220P	1	IC101H	PQVINJM4558M	IC	8
C257~ C259	PQCUV1H104ZF	0.1	3	IC102A~	PQVIMC45503W	IC	8
C260	ECEA1ESS471U	470	S 1	IC102H	PQVIMC45503W	IC	8
C262~ C264	ECEA1VU330	33	3	IC111	PQVI63HB110	IC	S 1
C265	PQCUV1H104ZF	0.1	1	IC112	PQVISN7L138M	IC	1
C270	ECEA1AU101	100	1	IC114	PQVISN7L138M	IC	1
C272	PQCUV1H104ZF	0.1	1	IC116	PQVISN7L640M	IC	1
C273	PQCUV1H104ZF	0.1	1	IC117	PQVISN7L08S	IC	S 1
C280	PQCUV1H104ZF	0.1	1	IC120	PQVISN7L04S	IC	S 1
C281	PQCUV1H104ZF	0.1	1	IC121	PQVISN7L14S	IC	S 1
C282	PQCUV1H104ZF	0.1	1	IC122	PQVISN7L273M	IC	S 1
C283	PQCUV1H104ZF	0.1	1	IC123	PQVISN7L14S	IC	S 1
C284	PQCUV1H104ZF	0.1	1	Q101A~	2SD1897	(TRANSISTORS)	8
C285	PQCUV1H104ZF	0.1	1	Q101H	2SD1897	TRANSISTOR(SI)	8
C287	PQCUV1H104ZF	0.1	1	Q102A~	PQVTDT143EK	TRANSISTOR(SI)	8
C288	PQCUV1H104ZF	0.1	1	Q102H	PQVTDT143EK	TRANSISTOR(SI)	8
C289	PQCUV1H104ZF	0.1	1	Q111	2SB1322	TRANSISTOR(SI) (or 2SB1237R)	S 1
C290	PQCUV1H104ZF	0.1	1	Q112	UN5113	TRANSISTOR(SI)	S 1
C292	ECEA1EU101	100	1	Q120A~	2SA1627	TRANSISTOR(SI)	8
C295, 296	PQCUV1H104ZF	0.1	2	Q120H	PQCUV1H104ZF	(DIODES)	8
CN200	PQJS50A04Z	(CONNECTORS)	1	D101A~	PQVDS1YB40F1	DIODE(SI)	8
CN201	PQJS50R15Z	CONNECTOR ,50P	1	D101H	PQVDS1YB40F1	DIODE(SI)	8
CN201	PQJS50R15Z	CONNECTOR ,50P	1	D102A~	PQVDHZS2B1	DIODE(SI)	8
L200A~ L200H	PQLQZM100K	(CHOKE COILS) CHOKE COIL	S 8	D102H	PQVDHZS2B1	DIODE(SI)	8
L201A~ L201H	PQLQZM100K	CHOKE COIL	S 8	D103A~	PQVDHZS2B1	DIODE(SI)	8
L202A~ L202H	PQLE106	CHOKE COIL	8	D103H	MA3047	DIODE(SI)	8
L203A~ L203H	PQLE106	CHOKE COIL	8	D104A~	MA3047	DIODE(SI)	8
RY200A, RY200B	PQSL44Z	(RELAYS)	2	D104H	MA3047	DIODE(SI)	8
RY201A, RY202A-	PQSL119Z	RELAY	9	D105A~	MA3047	DIODE(SI)	8
RY202H				D105H	MA4056	DIODE(SI)	1
T201A~ T201H	ETE13K79AY	(TRANSFORMERS)	8	D108A~	MA723	DIODE(SI)	1
		TRANSFORMER		R101A~	RLS71	DIODE(SI)	8
F200, 201	PQBA1N15NMAL	(FUSES)	2	R101H	ERQN1VJ223	(RESISTORS)	8
		FUSE		R102A~	PQ4R10XJ822	22K	8
				R102H	ERDS2TJ390	8.2K	8
				R103A~	PQ4R10XJ103	39	8
				R103H	PQ4R10XJ471	10K	8
				R104A~	PQ4R10XJ103	470	8
				R104H	PQ4R10XJ471	10K	8
				R105A~	PQ4R10XF1211	1.21K	8
				R105H	PQ4R10XF1211	1.21K	8
				R107A~	PQ4R10XF1001	1K	8
				R107H	PQ4R10XF1001	1K	8
				R108A~	PQ4R10XF2323	232K	8
				R108H	PQ4R10XF2323	232K	8

This replacement parts list is for CANADA version only.

Refer to the simplified manual (cover) for other areas.

Ref. No.	Part No.	Value, Part Name & Description	Pcs	Ref. No.	Part No.	Value, Part Name & Description	Pcs
R111A~	PQ4R10XF1003	100K	8	CN101	PQJS50R15Z	(CONNECTORS)	
R111H				CN104	PQJS22A15Z	CONNECTOR, 50P	1
R112A~	PQ4R10XF1003	100K	8	CN105	PQJS08A15Z	CONNECTOR, 22P	1
R112H				CN106	PQJS22A15Z	CONNECTOR, 8P	1
R113A~	PQ4R10XF1003	100K	8	CN107	PQJS08A15Z	CONNECTOR, 22P	1
R113H				CN108~	PQJJ1TB25Y	CONNECTOR, 8P	1
R114A~	PQ4R10XF4702	47K	8	CN111		JACK, TEL	4
R114H				L101A~	PQLE106	(COILS)	
R115A~	PQ4R10XF1203	120K	8	L101H		COIL	8
R115H				L102A~	PQLE106	COIL	8
R116A~	PQ4R10XF4702	47K	8	L102H		COIL	8
R116H				L103A~	PQLE106	COIL	8
R118A~	ERDS2TJ122	1.2K	8	L103H		COIL	8
R118H				L104A~	PQLE106	COIL	8
R119A~	PQ4R10XF1211	1.21K	8	L104H		COIL	8
R119H				PC101A~	ON3181R	(PHOTO ELECTRIC TRANSDUCERS)	
R122A~	PQ4R10XJ222	2.2K	8	PC101H		PHOTO ELECTRIC TRANSDUCER	8
R122H				PC102A~	PQVITLP627	PHOTO ELECTRIC TRANSDUCER	8
R125 ~	PQ4R10XJ101	100	8	PC102H			
R132				RY101A~	PQL41Z	(RELAYS)	
R153	PQ4R10XJ152	1.5K	1	RY101H		RELAY	8
R154	PQRD1VJ221	220	1	SA101A~	PQVDRA311PT2	(VARISTORS)	
R155~	PQ4R10XJ103	10K	8	SA101H		VARISTOR (SURGE ABSORBER)	8
R160				SA102A~	PQVDRA311PT2	VARISTOR (SURGE ABSORBER)	8
R161	PQ4R10XJ101	100	1	SA102H		VARISTOR (SURGE ABSORBER)	8
R161A~	ERDS2TJ560	56	8	SA103A~	PQVDDSV301Y	VARISTOR (SURGE ABSORBER)	8
R161H				SA103H		VARISTOR (SURGE ABSORBER)	8
R162A~	PQ4R10XJ104	100K	8	SA104	PQVDDSV301Y	VARISTOR (SURGE ABSORBER)	1
R162H				ZR101A~	ERZC07DK820	VARISTOR	S 8
R163A ~	PQRQ25VJ5R6	5.6	8	ZR101H			
R163H				T101A~	ETA14Y85AY	(TRANSFORMERS)	
R164A~	ERDS2TJ272	2.7K	8	T101H		TRANSFORMER	S 8
R164H							
R165A~	ERJ6ENF5360	536	8				
R165H							
J151~	PQ4R10XJ000	0	4				
J154							
J155A~	PQ4R10XJ000	0	8				
J155H							
J156A~	PQ4R10XJ000	0	8				
J156H							
		(CAPACITORS)					
C101A ~	ECKDKC222KB	0.0022	8	PCB4	PQWP4TD1232C	SMDR / LED BOARD ASS'Y (RTL)	1
C101H				LED	LN242RP	(DIODE)	
C102A~	ECQE2474KF	0.47	8			DIODE(SI)	
C102H							
C103A~	ECEA1HU100	10	8			(TRANSISTORS)	
C103H				R700	ERDS2TJ821	820	1
C104A~	ECEA1HU220	22	8	R701	ERDS2TJ821	820	1
C104H				R702	ERDS2TJ821	820	1
C105A~	PQCUV1H102J	0.001	8	R703	ERDS2TJ821	820	1
C105H							
C106A~	PQCUV1H473MD	0.047	8	C700	ECKD1H392MD	(CAPACITORS)	
C106H				C701	ECKD1H392MD	0.0039	S 1
C107A~	PQCUV1H820JC	82P	8	C702	ECKD1H392MD	0.0039	S 1
C107H				C703	ECKD1H392MD	0.0039	S 1
C108A~	ECUV1H104MD	0.1	8				
C108H							
C109A	PQCUV1H223KB	0.022	8	CN701	PQJS06R49Z	(CONNECTORS)	
C109H				CN702	PQJS25P31Z	CONNECTOR, 6P	1
C110A~	PQCUV1H223KB	0.022	8	CN703	PQJS02R48Z	SOCKET, 25P	1
C110H						CONNECTOR, 2P	1
C111A~	ECEA1HKS47	0.47	8				
C111H							
C120	PQCUV1H101JC	100	1				
C151	ECEA1HU330	33	1				
C152	ECEA1HU330	33	1				
C153	ECEA1HU330	33	1				
C154	ECEA1HKS010	1	1				
C155	ECEA1ESS331	330	1				
C156	ECEA0JU222	2200	1				

This replacement parts list is for CANADA version only.

Refer to the simplified manual (cover) for other areas.

Ref. No.	Part No.	Value, Part Name & Description	Pcs	Ref. No.	Part No.	Value, Part Name & Description	Pcs
CN402	PQJP64A09Z	(CONNECTORS) CONNECTOR, 64P	1	R460	PORF2TLK50M	5	1
CN403	PQJP50A09Z	CONNECTOR, 50P	1	R462	ERDS2TJ562	5.6K	1
CN404	PQJP50A09Z	CONNECTOR, 50P	1	R463	ERDS2TJ472	4.7K	1
CN405	PQJP50A09Z	CONNECTOR, 50P	1	R464	ERDS2TJ2R2	2.2	1
CN406	PQJP60A09Z	CONNECTOR, 60P	1	R465	ERG2SJ101	100	1
CN407	PQJP60A09Z	CONNECTOR, 60P	1	R466	ERDS2TJ390	39	1
CN408	PQJP60A09Z	CONNECTOR, 60P	1	R467	ERDS2TJ102	1K	1
CN409	PQJP50A09Z	CONNECTOR, 50P	1	R469	ER016CKF2561	256	1
CN410	PQJP34A09Z	CONNECTOR, 34P	1	R470	ER016CKF2701	2.7K	1
CN411	PQJP40A09Z	CONNECTOR, 40P	1	R471	ER016CKF1522	15.2K	1
POWER SUPPLY UNIT PARTS				(CAPACITORS)			
90	PQQT4164Z	(CHASSIS & ELECTRICAL PARTS) CAUTION LABEL	1	C400	ECQU2A684MX	0.68	1
91	PQMC10053Z	SHIELD COVER	1	C401	ECKDKC472KB	0.0047	1
92	PQMC10052Z	SHIELD CASE	1	C402	ECKDKC472KB	0.0047	1
93	PQHR447Z	SPACER-A	1	C403	ECKDKC472KB	0.0047	1
94	PQHR10178Z	SPACER-B	1	C404	ECKDKC332KB	0.0033	1
95	PQHR10179Z	SPACER-C	1	C405	ECKWRS472ME	0.0047	1
96	PQJS02R46Z	CONNECTOR, 2P	1	C406	ECKWRS472ME	0.0047	1
97	PQJP04R07Z	CONNECTOR, 4P	1	C407	ECKDKC332KB	0.0033	1
98	PQJP3A3Z	SOCKET, AC	1	C408	EC0S2DB681BA	680P	1
99	EST15304T	SWITCH, POWER	1	C409	EC0S2DB681BA	680P	1
100	PQMH10027Z	ANGLE, POWER SW	1	C410	ECKW3A151KB	150P	1
101	PQJV3Z	HOLDER, FUSE	1	C411	ECQE6224RJ	0.22	1
102	XBA2C25ND1L	FUSE	1	C412	ECQE10472KF	0.0047	1
103	PQQT10469Z	FUSE LABEL	1	C414	ECQB1H222JF	0.0022	1
PCB6	PQWP6TD1232C	POWER SUPPLY BOARD ASS'Y (RTL)	1	C415	ECQB1H392JF	0.0039	1
		(ICs)		C416	ECKZ3A101KB	100P	1
IC400	PQVISTK73904	IC	1	C417	ECQE1H683JZ	0.068	1
IC450	PQVISTK732C	IC	1	C450	ECEA1VFG332	3300	1
IC451	PQVIHL05003	IC	1	C452	ECQB1H102JZ	0.001	S
IC452	PQVILA6500	IC	1	C454	ECEA1JFG102	1000	1
		(TRANSISTOR)		C455	ECEA1JFG102	1000	1
Q450	2SC4641	TRANSISTOR(SI)	1	C456	ECEA1VFG331	330	1
		(DIODES)		C457	ECEA1HGE010	1	1
D400	PQVDD5SB40	DIODE (SI)	1	C458	ECEA1HGE010	1000	1
D401	PQVDERD3805L	DIODE (SI)	1	C459	ECQB1H102JZ	0.001	S
D402	PQVDRD13FB	DIODE(SI)	1	C460	ECEA1EFG102	1000	1
D450	PQVDRD6.2FB	DIODE (SI)	1	C461	ECEA1HGA0R1	0.1	1
D451	PQVDC25P30F	DIODE (SI)	1	C462	ECEA1CFG102	0.001	1
D452	PQVDC25P30F	DIODE (SI)	1	C463	ECQV1H104JZ	0.1	1
D453	MA4057M	DIODE(SI)	1	C464	ECEA1HGE100	10	1
D454	PQVDD10SC4M	DIODE (SI)	1	C465	ECQV1H104JZ	0.1	1
D455	PQVDD10SC4M	DIODE (SI)	1	C466	ECEA1EGE101	100	1
		(RESISTORS)		C467	ECEA1VFG101	100	1
R401	ERS1TJ474	470K	1	C468	ECEA1VFG101	100	1
R402	ERDS1TJ104	100K	1	SA400	ERZC14DK271U	(VARISTOR) VARISTOR	1
R403	ERG2SJ223	22K	1	VR450	EVMF5S00B23	(VARIABLE RESISTORS)	
R404	ER016CKF1801	1.8K	1	VR451	EVMF5S00B23	SEMI-FIXED RESISTOR, 2KΩ (S)	1
R405	ERF5TKR22M	0.22	1	CN400	PQJP2D98Z	SEMI-FIXED RESISTOR, 2KΩ (S)	1
R406	ER016CKF4700	470	1	CN401	PQJS07R50Z	CONNECTOR, 2P	1
R407	ER016CKF5110	511	1	CN402	PQJP4D30Z	CONNECTOR, 7P	1
R408	ERG3SJ101	100	1	CN403	PQJP4D46Z	CONNECTOR, 4P	1
R409	ERDS1TJ104	100K	1	CR400	PQVDMGC4R3R2	CONNECTOR, 4P	1
R450	ERDS2TJ222	2.2K	1	CR401	PQVDMGC4R3R2	(COMPONENT COMBINATION)	1
R451	ERDS2TJ122	1.2K	1			COMPONENT COMBINATION	1
R453	ERDS2TJ562	5.6K	1			COMPONENT COMBINATION	1
R454	ERDS2TJ472	4.7K	1	SCR450	PQVDTCSF5B41	(THYRISTOR) THYRISTOR	1
R455	ERG3SJ271	270	1			(COILS)	
R456	ERDS2TJ100	10	1	L401	ELF18D450M	COIL	1
R457	ERF5TLK75M	700K	1	L400	ELF18D480C	COIL	1
R458	ERDS2TJ272	2.7K	1	L455	PQLE127	COIL	1
R459	ERDS2TJ392	3.9K	1	L450	PQLE128	COIL	1
				L451	PQLE129	COIL	1

This replacement parts list is for CANADA version only.

Refer to the simplified manual (cover) for other areas.

Ref. No.	Part No.	Part Name & Description	Pcs
L452	PQLE72	COIL	1
L453	POLE94	COIL	1
L454	POLE94	COIL	1
T400	ETS42AC111AC	(TRANSFORMER) TRANSFORMER	▲ 1
PC400	PQVIPC817CD	(PHOTO ELECTRIC TRANSDUCER) PHOTO COUPLER	▲ 1
TH401	PQRTD0WFL5R0	(THERMISTOR) THERMISTOR	▲ 1
F450	XBA1C40N1001	(FUSE) FUSE	▲ 1

FIXTURES AND TOOL

EC1	PQZZ64K2Z	EXTENSION CORD, 64P	1
EC2	PQZZ60K1Z	EXTENSION CORD, 60P	1
EC3	PQZZ50K2Z	EXTENSION CORD, 50P	1
EC4	PQZZ40K1Z	EXTENSION CORD, 40P	1
EC5	PQZZ34K1Z	EXTENSION CORD, 34P	1

Notes:
Extension cords are useful for servicing.
(They make servicing easy.)

Service Manual

and Technical Guide

DIGITAL SUPER HYBRID SYSTEM

KX-TD1232BX

- Please use this manual together with the original Service Manual for KX-TD1232C, Order No. KM49307582C1. This Service Manual indicates the main differences between; Original KX-TD1232C and KX-TD1232BX.

■ SPECIFICATIONS (Change of original page 4)

General Description

4. Power Supplies

Primary	120 V AC, 60 Hz	→	Primary	220-240 V AC, 50/60 Hz
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Characteristics

5. Primary Power

120V AC, 60 Hz	→	220-240 V AC, 50/60Hz
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(Model: KX-TD1232C)	(Model: KX-TD1232BX)
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■ INSULATION RESISTANCE TEST (Change of original page 3)

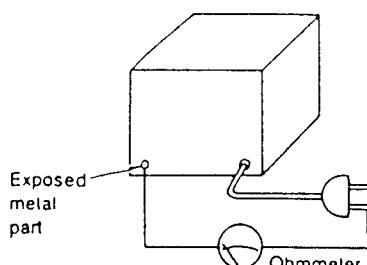


Fig. 2

Resistance=Approx. $5\text{ M}\Omega$ ← Change
(at DC 500 V)

(KX-TD1232BX)

Panasonic

This replacement parts list is for KX-TD1232BX version only. Refer to the simplified manual (cover) for other areas.

REPLACEMENT PARTS LIST

Model KX-TD1232BX

Notes:

1. The marking (RTL) indicates that the Retention Time is limited for this item. After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability is dependant on the type of assembly, and in accordance with the laws governing part and product retention. After the end of this period, the assembly will no longer be available.

2. Important safety notice.

Components identified by the mark special characteristics important for safety.

When replacing any of these components, use only manufacturer's specified parts.

3. The S mark indicates service standard parts and may differ from production parts.

4. RESISTORS & CAPACITORS

Unless otherwise specified.

All resistors are in ohms (Ω) K=1000 Ω , M=1000K Ω

All capacitors are in MICRO FARADS(μF) P= $\mu\mu F$

*Type & Wattage of Resistor

Type

ERC: Solid	ERX: Metal Film	PQRD: Carbon
ERD: Carbon	ERG: Metal Oxide	PQRQ: Fuse
PQ4R: Chip	ERO: Metal Film	ERF: Wire Wound

Wattage

10, 16, 18: 1/8W	14, 25, S2: 1/4W	12, 50, S1: 1/2W	1: 1W	2: 2W	5: 5W
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*Type & Voltage of Capacitor

Type

ECCF: Semi-Conductor	ECCD, ECKD, PQCBC, PQVP: Ceramic
ECQS: Styrol	ECQM, ECQV, ECQE, ECQU, ECQB: Polyester
PQCBX, ECUV: Chip	ECEA, ECSZ, ECOS: Electrolytic
ECMS: Mica	ECQP: Polypropylene

Voltage

ECQ Type	ECQG ECQV Type	ECSZ Type	Others		
1H: 50V	05: 50V	OF: 3.15V	OJ: 6.3V	1V: 35V	
2A: 100V	1: 100V	1A: 10V	1A: 10V	50, 1H: 50V	
2E: 250V	2: 200V	1V: 35V	1C: 16V	1J: 63V	
2H: 500V		OJ: 6.3V	1E, 25: 25V	2A: 100V	

Ref. No.	Part No.	Part Name & Description	Pcs
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CABINET & ELECTRICAL PARTS

Ref. No.	Part No.	Part Name & Description	Pcs	Ref. No.	Part No.	Value, Part Name & Description	Pcs				
CABINET & ELECTRICAL PARTS											
1	PQKE10002Z1	TOP COVER	1	A1	PQJA223Z	AC CORD	1				
2	PQHD10011Z	SCREW	2	A2	PQJP1E1Z	PLUG	2				
3	PQUS141Z	COIL SPRING	2	A3	PQJP1E2Z	PLUG	2				
4	PQKV10006Z1	COVER-A, FRONT	1	A4	PQHR10113Z1	COVER, TEL CORD	1				
5	PQKV10005Z1	COVER-B, FRONT	2	A5	PQHE10Z	MOUNTING BRACKET (CURL PLUG)	4				
6	PQHR10031Z	CLAMPER-A	1	A6	PQHE5008Z	MOUNTING BRACKET (SCREW)	4				
7	PQKF10018Z1	INSIDE CABINET	1	A7	PQQX10191Z	USERS GUIDE (FOR SLT)	1				
8	PQKK10018Z1	LID, ROM	1	A8	PQQX10190Y	USERS GUIDE	1				
9	PQMH10008Z	ANGLE, FRONT COVER	2	A9	PQQX10193Y	TEMPLATE	1				
10	PQQT10125Z	CAUTION LABEL-A	1	A10	XZB05X08A03	PROTECTION COVER (SCREW etc)	2				
11	PQHR10028Z	CLAMPER-B	2	A11	XZB23X35A01	PROTECTION COVER (DOCUMENTS)	1				
12	PQHR10029Z	CLAMPER-C	2	A12	PQQX10189Y	INSTALLATION MANUAL	1				
13	XUC3VW	E-RING	1	A13	PQQX10496Y	PROGRAMMING TABLE	1				
14	PQMH10009Z	HINGE-A	2	P1	PQPK10438Z	PACKING CASE	1				
15	PQMC10010Z	ANGLE, FG (TOP COVER)	1	P2	PQPD10045Z	CUSHION, TOP	1				
16	PQMC10064Z	SHEET, TOP COVER	1	P3	PQPN10196Z	CUSHION, L/R	2				
20	PQKM10021Z1	CABINET BODY	1	P4	PQPN10191Z	ACCESSORY BOX	1				
21	PQHR10032Z	COVER, FG SPRING	1	CPU BOARD PARTS							
22	PQQT10470Z	CAUTION LABEL-B	1	PCB1	PQWP1TD1232X	CPU BOARD ASS'Y (RTL)					
23	PQQT10126X	CAUTION LABEL-C	1			(ICs)					
24	PQMH10010Y	HINGE-B	1	IC 1	PQVI68301FCG	IC	1				
25	PQMH10010Z	HINGE-C	1	IC 2	PQVI620890F	IC	1				
26	PQMH10007Z	SPRING, FG	1	IC 3	PQVIMT8980DE	IC	1				
27	PQMC10009Z	ANGLE, FG (CABINET BODY)	1	IC 6~8	PQVIMC45503P	IC	3				
28	PQGP10009Z1	PANEL, LED	1	IC 9	PQVIS7860SG	IC	1				
29	PQGG10009Z1	GRILLE, LED	1	IC 10~12	PQVINJM4558D	IC	5				
30	PQMH10026Z	FRAME, BELL TRANSFORMER	1								
31	PQLT1U9M1A	BELL TRANSFORMER	1	IC 13	PQVIP5520C	IC	1				
32	PQMC10063Z	SHEET, CABINET BODY	1	IC 15	PQVHD75188P	IC	1				
33	PQGT10510Z	NAME PLATE	1	IC 16	PQVHD75189P	IC	1				
				IC 17	PQVISN7H00S	IC	1				
				IC 18	PQVISN7L00S	IC	1				
				IC 19	PQWI2TD1232C	IC (ROM)	1				
				IC 20, 21	PQWI1D1232C2	IC (ROM PACK)	1				
				IC 22, 23	PQVITC5183SD	IC	2				
				IC 24, 25	PQVIMB84256D	IC	2				
				IC 26	PQVIMS6242BS	IC	1				
				IC 29	PQVISN7L368M	IC	1				
				IC 31	PQVISN7L640M	IC	1				
				IC 32	PQVISN7L365S	IC	1				
				IC 33, 34	PQVISN7L368M	IC	2				
				IC 35	PQVISN7L365S	IC					
						(TRANSISTORS)					
				Q 5	PQVTDTA144EK	TRANSISTOR(SI)	1				
				Q 6	2SC2412K	TRANSISTOR(SI)	1				
				Q 7	2SC2412K	TRANSISTOR(SI)	1				
				Q 8	PQVTDTA143E	TRANSISTOR(SI)	1				
				Q 9	PQVTDTA144E	TRANSISTOR(SI)	1				
				Q10	2SA933	TRANSISTOR(SI) (or 2SA1317)	1				
				Q11	2SC2412K	TRANSISTOR(SI)	1				
				Q12	2SC2878	TRANSISTOR(SI)	1				
				Q13	2SC2412K	TRANSISTOR(SI)	1				
				Q14	2SC2878	TRANSISTOR(SI)	1				
				Q601, 603	PQVTDTA144E	TRANSISTOR(SI)	2				
				Q602, 604	PQVTDTA144EK	TRANSISTOR(SI)	2				
						(DIODES)					
				D1	MA4091	DIODE(SI)	1				
				D3	MA723	DIODE(SI)	1				
				D4	PQVDAK03	DIODE(SI)	1				
				D7~10	MA4068	DIODE(SI)	4				
				D11, 12	RLS71	DIODE(SI)	2				
				D13, 14	MA4030	DIODE(SI)	2				
				D15	MA4056	DIODE(SI)	1				
				D16, 17	RLS71	DIODE(SI)	2				
				D20, 21	MA723	DIODE(SI)	2				

This replacement parts list is for KX-TD1232BX version only. Refer to the simplified manual (cover) for other areas.

Ref. No.	Part No.	Value	Pcs	Ref. No.	Part No.	Value	Pcs
R 4	PQ4R10XJ471	(RESISTORS)		R91~94	PQ4R10XJ103	10K	6
R 5	PQ4R10XJ472	470	1	,96, 97	PQ4R10XJ103	10K	
R 6	PQ4R10XJ223	4.7K	1	R110~112	PQ4R10XJ470	47	3
R 7	PQ4R10XJ103	22K	1	R113	PQ4R10XJ103	10K	1
R 8	PQ4R10XJ683	10K	1	R114	PQ4R10XJ103	10K	1
R 9	PQ4R10XJ124	68K	1	R115	PQ4R10XJ222	2.2K	1
R12	PQ4R10XJ393	120K	1	R116	PQ4R10XJ472	4.7K	1
R13	PQ4R10XF1782	39K	1	R117	PQ4R10XJ103	10K	1
R14	PQ4R10XJ104	17.8K	1	R118	PQ4R10XJ333	33K	1
R15	PQ4R10XJ103	100K	1	R119	PQ4R10XJ103	10K	1
R16	PQ4R10XJ274	10K	1	R120	PQ4R10XJ334	330K	1
R17	PQ4R10XJ183	270K	1	R121	PQ4R10XJ222	2.2K	1
R18	PQ4R10XJ103	18K	1	R122	PQ4R10XJ472	4.7K	1
R19	PQ4R10XJ561	10K	1	R123	PQ4R10XJ472	10K	1
R20	PQ4R10XJ105	56K	1	R124	PQ4R10XJ333	4.7K	1
R21	PQ4R10XJ104	1M	1	R125	PQ4R10XJ103	330K	1
R22	PQ4R10XJ563	100K	1	R126	PQ4R10XJ470	10K	1
R23	PQ4R10XJ104	56K	1	R127	PQ4R10XJ334	4.7K	1
R24	PQ4R10XJ124	100K	1	R128	PQ4R10XJ472	330K	1
R27	PQ4R10XJ823	100K	1	R129	PQ4R10XJ470	4.7K	1
R28	PQ4R10XJ104	82K	1	R130	PQ4R10XJ470	100	1
R29	PQ4R10XF1211	1.21K	1	R131	PQ4R10XJ470	100	1
R30	PQ4R10XF1211	1.21K	1	R132	PQ4R10XJ470	100	1
R31	PQ4R10XJ224	1.21K	1	R133	PQ4R10XJ470	100	1
R32	PQ4R10XF1401	220K	1	R134	PQ4R10XJ390	100	1
R33	PQ4R10XJ823	1.4K	1	R135	PQ4R10XJ470	100	1
R34	PQ4R10XJ472	82K	1	R136	PQ4R10XJ470	100	1
R35	PQ4R10XJ333	4.7K	1	R137	PQ4R10XJ470	100	1
R36	PQ4R10XJ104	4.7K	1	R138	PQ4R10XJ101	100	1
R37	PQ4R10XJ104	33K	1	R139	PQ4R10XJ101	100	1
R38	PQ4R10XJ104	33K	1	R140	PQ4R10XJ101	100	1
R39	PQ4R10XJ124	100K	1	R141	PQ4R10XJ101	100	1
R40	PQ4R10XJ104	100K	1	R142	PQ4R10XJ101	100	1
R48	PQ4R10XJ333	100K	1	R143	PQ4R10XJ101	100	1
R50	PQ4R10XJ333	100K	1	R144	PQ4R10XJ101	100	1
R51	PQ4R10XJ472	100K	1	R145	PQ4R10XJ101	100	1
R52	PQ4R10XJ104	100K	1	R146	PQ4R10XJ470	100	1
R53	PQ4R10XJ104	100K	1	R147	PQ4R10XJ470	100	1
R54	PQ4R10XJ102	100K	1	R148	PQ4R10XJ470	100	1
R55	PQ4R10XJ104	100K	1	R149	PQ4R10XJ470	100	1
R61	PQ4R10XJ103	220K	1	R150	PQ4R10XJ470	100	1
R62	PQ4R10XJ223	10K	1	R151	PQ4R10XJ470	100	1
R65	PQ4R10XJ561	10K	1	R152	PQ4R10XJ470	100	1
R66	PQ4R10XJ561	560	1	R153	PQ4R10XJ470	100	1
R67	PQ4R10XJ103	560	1	R154	PQ4R10XJ470	100	1
R68	PQ4R10XJ103	10K	1	R155	PQ4R10XJ470	100	1
R69	PQ4R10XJ103	10K	1	R156	PQ4R10XJ470	100	1
R70	PQ4R10XJ103	10K	1	R157	PQ4R10XJ470	100	1
R71	PQ4R10XJ103	10K	1	R158	PQ4R10XJ470	100	1
R72	PQ4R10XJ103	10K	1	R159	PQ4R10XJ470	100	1
R73	PQ4R10XJ103	10K	1	R160	PQ4R10XJ470	100	1
R74	PQ4R10XJ103	10K	1	R161	PQ4R10XJ470	100	1
R75	PQ4R10XJ103	10K	1	R162	PQ4R10XJ470	100	1
R76	PQ4R10XJ103	10K	1	R163	PQ4R10XJ470	100	1
R77	PQ4R10XJ103	10K	1	R164	PQ4R10XJ470	100	1
R78	PQ4R10XJ103	10K	1	R165	PQ4R10XJ470	100	1
R79	PQ4R10XJ103	10K	1	R166	PQ4R10XJ470	100	1
R83	PQ4R10XJ103	10K	1	R167	PQ4R10XJ470	100	1
R84	PQ4R10XJ103	10K	1	R168	PQ4R10XJ470	100	1
R85	PQ4R10XJ103	10K	1	R169	PQ4R10XJ470	100	1
R87	PQ4R10XJ103	10K	1	R170	PQ4R10XJ470	100	1
	ERDS1TJ151	150	1	R171	PQ4R10XJ470	100	1
	PQ4R10XJ152	1.5K	1	R172	PQ4R10XJ470	100	1
	PQ4R10XJ681	680	1	R173	PQ4R10XJ470	100	1
	PQ4R10XJ103	680	1	R174	PQ4R10XJ470	100	1
				R175	PQ4R10XJ470	100	1

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Ref. No.	Part No.	Value	Pcs	Ref. No.	Part No.	Value, Part Name & Description	Pcs
R176	PQ4R10XJ560	56	1	C20	PQCUV1H332KB	0.0033	1
R177	PQ4R10XJ560	56	1	C21	PQCUV1H104ZF	0.1	1
R178	PQ4R10XJ560	56	1	C22, 23	PQCUV1H101JC	100P	2
R179	PQ4R10XJ560	56	1	C24	PQCUV1H332KB	0.0033	1
R180	PQ4R10XJ560	56	1	C25, 26	PQCUV1H104ZF	0.1	2
R181	PQ4R10XJ560	56	1	C27	PQCUV1H102J	0.001	1
R182	PQ4R10XJ560	56	1	C28	PQCUV1H104ZF	0.1	1
R183	PQ4R10XJ560	56	1	C29	PQCUV1H101JC	100P	1
R184	PQ4R10XJ560	56	1	C30	PQCUV1H104ZF	0.1	1
R185	PQ4R10XJ560	56	1	C31	PQCUV1H102J	0.001	1
R186	PQ4R10XJ560	56	1	C33~38	PQCUV1H223KB	0.022	6
R187	PQ4R10XJ560	56	1	C35	PQCUV1H223KB	0.022	1
R188	PQ4R10XJ560	56	1	C36	PQCUV1H223KB	0.022	1
R189	PQ4R10XJ560	56	1	C37	PQCUV1H223KB	0.022	1
R190	PQ4R10XJ560	56	1	C38	PQCUV1H223KB	0.022	1
R191	PQ4R10XJ560	56	1	C39	PQCUV1H200JC	20P	1
R192	PQ4R10XJ560	56	1	C40	PQCUV1H223KB	0.022	1
R193	PQ4R10XJ560	56	1	C41	PQCUV1H223KB	0.022	1
R194	PQ4R10XJ560	56	1	C42	PQCUV1H223KB	0.022	1
R195	PQ4R10XJ560	56	1	C43	PQCUV1H223KB	0.022	1
R196	PQ4R10XJ560	56	1	C44	PQCUV1H223KB	0.022	1
R197	PQ4R10XJ560	56	1	C45	PQCUV1H223KB	0.022	1
R198	PQ4R10XJ560	56	1	C46	PQCUV1H223KB	0.022	1
R199	PQ4R10XJ560	56	1	C47	PQCUV1H223KB	0.022	1
R200	PQ4R10XJ560	56	1	C50	ECEA1EU331	330	1
R201, 202, 203	PQ4R10XJ102	1K	3	C53	PQCUV1H180JC	18P	1
R204	PQ4R10XJ103	10K	1	C54	PQCUV1H180JC	18P	1
R205	PQ4R10XJ103	10K	1	C55	PQCUV1H223KB	0.022	1
R206	PQ4R10XJ103	10K	1	C56	PQCUV1H223KB	0.022	1
R207	PQ4R10XJ103	10K	1	C59	ECEA1HU010	1	1
R208	PQ4R10XJ103	10K	1	C60	ECEA1HU010	1	1
R209	PQ4R10XJ103	10K	1	C61	ECEA1HU010	1	1
R210	PQ4R10XJ103	10K	1	C62	ECEA1HU010	1	1
R211	PQ4R10XJ103	10K	1	C63	ECEA1HU010	1	1
R212	PQ4R10XJ103	10K	1	C64	PQCUV1H223KB	0.022	1
R213	PQ4R10XJ103	10K	1	C66	ECEA1AU101	100	1
R214	PQ4R10XJ103	10K	1	C67	PQCUV1H223KB	0.022	1
R215	PQ4R10XJ103	10K	1	C68	PQCUV1H223KB	0.022	1
R216	PQ4R10XJ103	10K	1	C70	PQCUV1H223KB	0.022	1
R217	PQ4R10XJ103	10K	1	C71	PQCUV1H223KB	0.022	1
R218	PQ4R10XJ103	10K	1	C72	PQCUV1H223KB	0.022	1
R219	PQ4R10XJ103	10K	1	C80	PQCUV1H200JC	20P	1
R220	PQ4R10XJ223	22K	1	C81	PQCUV1H223KB	0.022	1
R221	PQ4R10XJ222	2.2K	1	C82	PQCUV1H223KB	0.022	1
R601, 602	PQ4R10XJ104	100K	2	C83	PQCUV1H223KB	0.022	1
R603	PQ4R10XJ331	330	1	C84	PQCUV1H223KB	0.022	1
R604	PQ4R10XJ151	150	1	C85	PQCUV1H223KB	0.022	1
R605	PQ4R10XJ824	820K	1	C86	PQCUV1H104ZF	0.1	1
R606	PQ4R10XJ223	22K	1	C87	ECEA1VU330	33	S 1
R608	PQ4R10XJ124	120K	1	C88	ECEA1HN2R2S	2.2	1
R609, 610, 611	PQ4R10XJ223	22K	3	C89	PQCUV1H104ZF	0.1	1
J1, 3	PQ4R10XJ000	0	2	C90	ECEA1VU330	33	S 1
J 5	ERDS2TJ0T	0	1	C91	ECEA1HN2R2S	2.2	1
J 6, 7	PQ4R10XJ000	0	2	C92, 93	PQCUV1H101JC	100P	2
C 1	(CAPACITORS)			C94	PQCUV1H470JC	47P	1
C 2	EECFE5R5474	5.47M	1	C95	PQCUV1H470JC	47P	1
C 3	ECEA1EU4R7	4.7	1	C96	PQCUV1H470JC	47P	1
C 8, 9	ECEA1HN3R3S	3.3	1	C97	PQCUV1H223KB	0.022	1
	ECQV1H104JZ	0.1	2	C98	PQCUV1H223KB	0.022	1
				C99	PQCUV1H223KB	0.022	1
C11	PQCUV1H104ZF	0.1	1	C601, 602	ECEA1EU4R7	4.7	S 2
C12	PQCUV1H101JC	100P	1	C603	PQCUV1H223KB	0.022	1
C13	PQCUV1H682KB	0.0068	1	C604	PQCUV1H104ZF	0.1	1
C16	PQCUV1H101JC	100P	1	T1	ETA14Y180AY	(TRANSFORMERS)	
C17	PQCUV1H104ZF	0.1	1	T2~5	PQLT2D6A	TRANSFORMER	
C19	PQCUV1H101JC	100P	1			TRANSFORMER	S 4

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Ref. No.	Part No.	Part Name & Description	Pcs	Ref. No.	Part No.	Value, Part Name & Description	Pcs
L7~14	PQLE106	(COILS) COIL	8	Q210	2SD2137	TRANSISTOR(SI)	1
L21~23	PQVFTU50MT	CERAMIC FILTER	3	Q211	UN5113	TRANSISTOR(SI)	1
L24~27	PQVF0M04RC01	CERAMIC FILTER	4	Q213	2SD1819A	TRANSISTOR(SI) (or 2SC4081R)	1
JAC1, 2	PQJJ1G1Z	(JACKS) JACK, PAGING	2	Q214	UN5213	TRANSISTOR(SI)	1
JAC3, 4	PQJJ1D3Z	JACK, EP	2	Q215	2SD2137	TRANSISTOR(SI)	1
CN1	PQJS64R15Z	(CONNECTORS) CONNECTOR, 64P	1	Q220A	UN5213	TRANSISTOR(SI)	1
CN4	PQJP2D70Z	CONNECTOR, 2P	1	Q221	PQVTDT143E	TRANSISTOR(SI)	1
CN9	PQJP20A08Z	CONNECTOR, 20P	1	Q251	2SB1322	TRANSISTOR(SI) (or 2SB1237R)	1
CN12	PQJP6D70Z	CONNECTOR, 6P	1	Q252	UN5113	TRANSISTOR(SI)	1
BAT	CR2354-1HF	(BATTERY) LITHIUM BATTERY	1	D203A	RLS71	(DIODES)	1
SW1	EVQ21409K	(SWITCHES) SWITCH	1	D204A~	RLS71	DIODE(SI)	8
SW2	POQS2A24Z	SWITCH	1	D204H	RLS71	DIODE(SI)	
SW3	ESD11V120	SWITCH	1	D205A~	RLS71	DIODE(SI)	8
X1	PQVCJ8192N8Z	(CRYSTAL OSCILLATORS) CRYSTAL OSCILLATOR	1	D205H	RLS71	DIODE(SI)	
X2	PQVCL3276N6Z	CRYSTAL OSCILLATOR	1	D206A~	RLS71	DIODE(SI)	8
Z1, 2, 4~6	PQRSLD8X103J	(COMPONENTS COMBINATIONS) RESISTOR ARRAY	5	D206H	RLS71	DIODE(SI)	
EXTENSION BOARD PARTS							
PCB2	PQWP2TD1232C	EXTENSION BOARD ASS'Y (RTL)	1	D207A~	RLS71	DIODE(SI)	4
IC201A~	PQVIMC45503W	(ICs) IC	8	D220, 221 , 223, 225	MA4056	DIODE(SI)	1
IC201H				D251	RLS71	DIODE(SI)	1
IC202A~	PQVINJM4558M	IC	8	R200A~	PQ4R10XJ330	(RESISTORS)	8
IC202H				R200H	33		
IC203A~	PQVINJM319V	IC	8	R201A~	PQ4R10XJ222	2.2K	8
IC203H				R201H	PQ4R10XJ222	2.2K	
IC211	PQVI603830F	IC	1	R202A~	PQ4R10XJ222	2.2K	
IC213	PQVIMT8952BE	IC	1	R202H	PQ4R10XJ101	100	1
IC215, 216	PQVICM8870FI	IC	S 2	R203	PQ4R10XJ105	1M	1
IC217, 218	PQVIMC4051BF	IC	S 2	R204	ERDS2TJ220	22	8
IC219	PQVISN7L14S	IC	S 1	R205A~	ERDS2TJ220	22	
IC220	PQVISN7L14S	IC	S 1	R205H	ERDS2TJ680	68	8
IC221	PQVISN7L14S	IC	S 1	R206A~	ERDS2TJ680	68	
IC222	PQVISN7L365S	IC	S 1	R206H	PQ4R10XJ682	6.8K	8
IC223	PQVISN7L86S	IC	S 1	R207A~	PQ4R10XJ682	6.8K	
IC224	PQVISN7L640M	IC	S 1	R207H	PQ4R10XJ682	6.8K	
Q200A~	2SB1218A	(TRANSISTORS) TRANSISTOR(SI)	S 4	R208A~	ERDS2TJ220	22	8
Q200D		(or 2SA1576R)		R208H	ERDS2TJ680	68	
Q200E~	2SD1819A	TRANSISTOR(SI)	S 4	R209A~	ERDS2TJ680	68	8
Q200H		(or 2SA4081R)		R209H			
Q201A~	2SB1218A	TRANSISTOR(SI)	S 7	R210A	PQ4R10XJ682	6.8K	8
Q201D,				R210H	PQ4R10XF3000	300	
Q201F~				R211A ~	PQ4R10XF3000	300	8
Q201H				R211H	PQ4R10XF2940	294	
Q201E	2SB1218A	TRANSISTOR(SI)	S 1	R212A~	PQ4R10XF2940	294	8
Q203A~	2SB1322	(or 2SA1576R)	S 8	R212H	PQ4R10XF3000	300	
Q203H		TRANSISTOR(SI)		R213A~	PQ4R10XF7502	75K	8
Q204A~	2SD1994A	TRANSISTOR(SI)	S 8	R213H	PQ4R10XF7502	75K	
Q204H				R214A~	PQ4R10XF1003	100K	8
Q205A~	2SD1819A	TRANSISTOR(SI)	S 8	R214H	PQ4R10XF1003	100K	
Q205H		(or 2SC4081R)		R215A~	PQ4R10XF1003	100K	8
Q206A~	2SD1819A	TRANSISTOR(SI)	S 8	R215H	PQ4R10XF4702	47K	8
Q206H		(or 2SC4081R)		R216A~	PQ4R10XF4702	47K	
Q207A~	PQVTDT143E	TRANSISTOR(SI)	S 8	R216H	PQ4R10XF4702	47K	8
Q207H				R217A~	PQ4R10XF4702	47K	
Q208A~	2SB1218A	TRANSISTOR(SI)	S 8	R217H	PQ4R10XF1003	100K	8
Q208H		(or 2SA1576R)		R218A~	PQ4R10XF1003	100K	
				R218H			

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Ref. No.	Part No.	Value	Pcs	Ref. No.	Part No.	Value	Pcs
R219A~	PQ4R10XF1003	100K	8	R268	PQ4R10XJ101	100	1
R219H				R269	PQ4R10XJ101	100	1
R220A~	PQ4R10XF1003	100K	8	R270	ERDS2TJ220	22	1
R220H				R270A~	PQ4R10XJ103	10K	8
R221A~	PQ4R10XF1003	100K	8	R270H			
R221H				R271	PQ4R10XJ682	6.8K	1
R222A~	PQ4R10XF3000	300	8	R272	PQ4R10XJ101	100	1
R222H				R273, 274	Not Used		
R223A~	PQ4R10XF7502	75K	8	R275A~	PQ4R10XJ563	56K	8
R223H				R275H			
R224A~	PQ4R10XJ153	15K	8	R276A~	PQ4R10XJ560	56	8
R224H				R276H			
R225A~	PQ4R10XJ333	33K	8	R277A~	PQ4R10XJ560	56	8
R225H				R277H			
R226A~	PQ4R10XJ103	10K	8	R278A~	PQ4R10XJ560	56	8
R226H				R278H			
R227A~	PQ4R10XJ473	47K	8	R279A~	PQ4R10XJ560	56	8
R227H				R279H			
R228A~	PQ4R10XJ123	12K	8	R280	PQ4R10XJ223	22K	1
R228H				R285	PQ4R10XJ122	1.2K	1
R229A~	PQ4R10XJ333	33K	8	R286	PQ4R10XJ152	1.5K	1
R229H				R290A~	PQ4R10XJ472	4.7K	8
R230A~	PQ4R10XJ103	10K	8	R290H			
R230H				R291A~	PQ4R10XJ472	4.7K	8
R231A~	PQ4R10XJ102	1K	8	R291H			
R231H				R292A~	PQ4R10XJ472	4.7K	8
R232A~	PQRD2TJ102	1K	8	R292H			
R232H				R293	PQ4R10XF6801	6.8K	1
R233A~	PQ4R10XJ000	0	8	R294	PQ4R10XF1201	1.2K	1
R233H				R295A~	PQ4R10XJ101	100	8
R234A~	PQ4R10XJ472	4.7K	8	R295H			
R234H				R296A~	PQ4R10XJ220	22	8
R235A~	PQ4R10XJ472	4.7K	8	R296H			
R235H				R297A~	PQ4R10XJ220	22	8
R236A~	PQ4R10XJ472	4.7K	8	R297H			
R236H				R299A~	PQ4R10XJ101	100	8
R237A~	PQ4R10XJ472	4.7K	8	R299H			
R237H				J201~	PQ4R10XJ000	0	4
R238A~	PQ4R10XJ330	33	8	J204			
R238H				J251A ~	PQ4R10XJ000	0	8
R239A~	PQ4R10XJ222	2.2K	8	J251H			
R239H				J253A~	PQ4R10XJ000	0	8
R240A~	PQ4R10XJ222	2.2K	8	J253H			
R240H				J255A~	PQ4R10XJ000	0	8
R241	PQ4R10XJ473	47K	1	J255H			
R242	PQ4R10XJ682	6.8K	1	J257A~	PQ4R10XJ000	0	8
R243	PQ4R10XJ223	22K	1	J257H			
R244	PQ4R10XJ472	4.7K	1	J259A ~	PQ4R10XJ000	0	8
R245	PQ4R10XJ153	15K	1	J259H			
R246	PQ4R10XJ152	1.5K	1	C200A~	ECEA1HU2R2	(CAPACITORS)	
R247	PQ4R10XJ223	22K	1	C200H			
R248A~	PQ4R10XJ471	470	8	C202A~	ECEA1HU2R2	2.2	8
R248H				C202H			
R251	PQ4R10XJ103	10K	1	C204A~	ECEA1HU100	10	8
R252	PQ4R10XJ103	10K	1	C204H			
R253	PQ4R10XJ103	10K	1	C205A~	ECEA1EN100S	10	8
R254	PQ4R10XJ103	10K	1	C205H			
R255	PQ4R10XJ393	39K	1	C206A~	ECEA1EN100S	10	8
R256	PQ4R10XJ104	100K	1	C206H			
R257	PQ4R10XJ334	330K	1	C207A~	ECEA1HU3R3	3.3	8
R258	PQ4R10XJ393	39K	1	C207H			
R259	PQ4R10XJ104	100K	1	C208A~	ECUV1H104MD	0.1	8
R260	PQ4R10XJ334	330K	1	C208H			
R261	PQRD1TJ820	82	1	C209A~	PQCUV1H104ZF	0.1	8
R262	PQ4R10XJ152	1.5K	1	C209H			
R263	PQ4R10XJ152	1.5K	1	C210A~	PQCUV1H104ZF	0.1	8
R264	PQ4R10XJ152	1.5K	1	C210H			
R265, 266	PQ4R10XJ103	10K	2				
R267	PQ4R10XJ101	100	1				

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Ref. No.	Part No.	Value, Part Name & Description	Pcs	Ref. No.	Part No.	Value, Part Name & Description	Pcs
C211A~ C211H C212A~ C212H C213A ~ C213H C214, 215 C216A ~ C216H C217A ~ C217H C218A~ C218H C219A~ C219H	ECEA1HN4R7S PQCUV1H104ZF PQCUV1H104ZF Not Used ECEA1HU2R2 PQCUV1H680JC PQCUV1H680JC ECUV1H104MD	4.7 0.1 0.1 2.2 68P 68P 0.1	8 8 8 8 8 8 8 8	ZR202A~ ZR202H ZR203A~ ZR203H ZR204A~ ZR204H ZR205A~ ZR205H F200,201 X201	PQVDNV039D03 PQVDNV039D03 PQVDNV039D03 PQVDNV039D03 PQVDNV039D03 (FUSES) PQBA1N15NMAL PQVBFC3584A1	(VARISTORS) VARISTOR VARISTOR VARISTOR VARISTOR (FUSES) FUSE (CERAMIC RESONATOR) CERAMIC RESONATOR	8 8 8 8 8 2 1
C220 C220A~ C220H C221 C222A~ C222H	ECEA1EU101 ECUV1H393KB ECEA1EU101 ECEA1HU100	100 0.039 100 10	1 8 1 8	CO LINE BOARD PARTS			
C251~ 254 C255 C256 C257~259	PQCUV1H223KB ECEA1VU330 PQCUV1H221JC PQCUV1H104ZF	0.022 33 220P 0.1	4 1 1 3	PCB3 IC101A~ IC101H IC102A~ IC102H IC111 IC112 IC114 IC116 IC117 IC120 IC121 IC122 IC123	PQWP3TD1232X PQVINJM4558M PQVIMC45503W PQVI63HB110 PQVISN7L138M PQVISN7L138M PQVISN7L640M PQVISN7L08S PQVISN7L04S PQVISN7L14S PQVISN7L273M PQVISN7L14S	CO LINE BOARD ASS'Y (RTL) (ICs) IC IC IC IC IC IC IC IC IC IC IC IC IC	1 8 8 8 1 1 1 1 1 1 1 1 1 1
C260 C262~264 C265	ECEA1ESS471U ECEA1VU330 PQCUV1H104ZF	470 33 0.1	1 3 1	Q101A ~ Q101H Q102A~ Q102H Q111 Q112 Q120A~ Q120H	2SD1897 PQVTDTC143EK	(TRANSISTORS) TRANSISTOR(SI) TRANSISTOR(SI)	8 8
C270 C272 C273	ECEA1AU101 PQCUV1H104ZF PQCUV1H104ZF	100 0.1 0.1	1 1 1	D101A~ D101H D102A~ D102H D103A~ D103H D104A~ D104H D105A~ D105H D108A~ D108H D154 D155	PQVDS1YB40F1 PQVDHZS2B1 PQVDHZS2B1 MA3047 MA3047 RLS71 MA4056 MA723	TRANSISTOR(SI) (or 2SB123'R) TRANSISTOR(SI) TRANSISTOR(SI)	1 1 8
CN200 CN201	PQJS50A04Z PQJS50R15Z	(CONNECTORS) CONNECTOR, 50P CONNECTOR, 50P	1 1	R101A~ R101H R102A ~ R102H R103A~ R103H R104A~ R104H R105A~ R105H R108A~ R108H R154 R155	ERQN1VJ223 PQ4R10XJ822 ERDS2TJ390 PQ4R10XJ103	(DIODES) DIODE(SI) DIODE(SI) DIODE(SI) DIODE(SI) DIODE(SI) DIODE(SI) DIODE(SI) DIODE(SI) DIODE(SI)	8 8 8 8 8 8 8 8 8
L200A~ L200H L201A ~ L201H L202A~D L202E~H L203A~ L203H	PQLQZM100K PQLQZM100K PQRPAR8R2 PQLE106 PQLE106	(CHOKE COILS) CHOKE COIL CHOKE COIL CHOKE COIL	8 8 4 4 8	R101A~ R101H R102A ~ R102H R103A~ R103H R104A~ R104H R105A~ R105H R108A~ R108H R154 R155	ERQN1VJ223 PQ4R10XJ822 ERDS2TJ390 PQ4R10XJ103	(RESISTORS) 22K 8.2K 39 10K	8 8 8 8 8
RY200A, RY200B RY201A, RY202A~ RY202H	PQSL44Z PQSL119Z	(RELAYS) RELAY RELAY	2 9	(TRANSFORMERS) TRANSFORMER			
T201A~	ETE13K79AY		8				

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Ref. No.	Part No.	Value, Part Name & Description	Pcs	Ref. No.	Part No.	Value, Part Name & Description	Pcs	
R105A~ R105H	PQ4R10XJ471	470	8	C111A~ C111H	ECEA1HUR47	0.47	8	
R107A~ R107H	PQ4R10XF1211	1.21K	8	C120	PQCUV1H101JC	100P	1	
R108A~ R108H	PQ4R10XJ821	820	8	C151	ECEA1HU330	33	1	
R110A~ R110H	PQ4R10XF2323	232K	8	C152	ECEA1HU330	33	1	
R111A~ R111H	PQ4R10XF1003	100K	8	C153	ECEA1HU330	33	1	
R112A~ R112H	PQ4R10XF1003	100K	8	C154	ECEA1HKS010	1	1	
R113A~ R113H	PQ4R10XF1003	100K	8	C155	ECEA1ESS331	330	1	
R114A~ R114H	PQ4R10XF4702	47K	8	C156	ECEA1AU222	2200	1	
R115A~ R115H	PQ4R10XF1203	120K	8	CN101	PQJS50R15Z	(CONNECTORS)	1	
R116A~ R116H	PQ4R10XF4702	47K	8	CN108~11	PQJU1TB25Y	CONNECTOR, 50P JACK, TEL	4	
R118A~ R118H	ERDS2TJ122	1.2K	8	L101A~ L101H	PQLE106	(COILS) COIL	8	
R119A~ R119H	PQ4R10XF1211	1.21K	8	L102A~ L102H	PQLE106	COIL	8	
R122A~ R122H	PQ4R10XJ222	2.2K	8	L103A~ L103H	PQLE106	COIL	8	
R125~132	PQ4R10XJ101	100	8	L104A~ L104H	PQLE106	COIL	8	
R153	PQ4R10XJ152	1.5K	1	PC101A~ PC101H	ON3181R	(PHOTO ELECTRIC TRANSDUCERS)	8	
R154	PQRD1VJ221	220	1	PC102A~ PC102H	PQVITLP627	PHOTO ELECTRIC TRANSDUCER	8	
R155~160	PQ4R10XJ103	10K	6	RY101A~ RY101H	PQSL41Z	(RELAYS) RELAY	8	
R161	PQ4R10XJ101	100	1	SA101A~ SA101H	PQVDB1A351	(VARISTORS) VARISTOR (SURGE ABSORBER)	8	
R161A~ R161H	ERDS2TJ560	56	8	SA102A~ SA102H	PQVDB1A351	VARISTOR (SURGE ABSORBER)	8	
R162A~ R162H	PQ4R10XJ104	100K	8	SA103A~ SA103H	PQVDB1A351	VARISTOR (SURGE ABSORBER)	8	
R163A~ R163H	PQRQ25VJ5R6	5.6	8	SA104	ERZC10DK681	VARISTOR	1	
R164A~ R164H	ERDS2TJ272	2.7K	8	ZR101A~ ZR101H	ERZC07DK820	VARISTOR	S 8	
R165A~ R165H	PQ4R10XJ471	470	8	T101A~ T101H	ETA14Y85AY	(TRANSFORMERS) TRANSFORMER	S 8	
J100A	ERDS2TJ0T	0	1	SMDR / LED BOARD PARTS				
J151~154	PQ4R10XJ000	0	4	PCB4	PQWP4TD1232C	SMDR / LED BOARD ASS'Y (RTL)	1	
J155A~ J155H	PQ4R10XJ000	0	8	LED	LN242RP	(DIODE) DIODE(SI)	S	
J156A~ J156H	PQ4R10XJ000	0	8	R700~703	ERDS2TJ821	(TRANSISTORS) 820	4	
C101A~ C101H	ECKDKC222KB	(CAPACITORS) 0.0022	8	C700~703	ECKD1H392MD	(CAPACITORS) 0.0039	S 4	
C102A~ C102H	ECQE2474KF	0.47	8	CN701	PQJS06R49Z	(CONNECTORS)	1	
C103A~ C103H	ECEA1HU100	10	8	CN702	PQJS25P31Z	CONNECTOR, 6P SOCKET, 25P	1	
C104A~ C104H	ECEA1HU220	22	8	CN703	PQJS02R48Z	CONNECTOR, 2P	1	
C105A~ C105H	PQCUV1H102J	0.001	8					
C106A~ C106H	PQCUV1H563MD	0.056	8					
C107A~ C107H	PQCUV1H820JC	82P	8					
C108A~ C108H	ECUV1H104MD	0.1	8					
C109A~ C109H	PQCUV1H223KB	0.022	8					
C110A~ C110H	PQCUV1H223KB	0.022	8					

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Ref. No.	Part No.	Value, Part Name & Description	Pcs	Ref. No.	Part No.	Value, Part Name & Description	Pcs
MOTHER BOARD PARTS							
PCB5	PQWP5TD1232C	MOTHER BOARD ASSY (RTL)	1	R450	ERDS2TJ222	2.2K	1
		(CONNECTORS)		R451	ERDS2TJ122	1.2K	1
CN402	PQJP64A09Z	CONNECTOR, 64P	1	R453	ERDS2TJ562	5.6K	1
CN403	PQJP50A09Z	CONNECTOR, 50P	1	R454	ERDS2TJ472	4.7K	1
CN404	PQJP50A09Z	CONNECTOR, 50P	1	R455	ERG3SJ271	270	1
CN405	PQJP50A09Z	CONNECTOR, 50P	1	R456	ERDS2TJ100	10	1
CN406	PQJP60A09Z	CONNECTOR, 60P	1	R457	ERF5TLK75M	700K	1
CN407	PQJP60A09Z	CONNECTOR, 60P	1	R458	ERDS2TJ272	2.7K	1
CN408	PQJP60A09Z	CONNECTOR, 60P	1	R459	ERDS2TJ392	3.9K	1
CN409	PQJP50A09Z	CONNECTOR, 50P	1	R460	PQRF2TLK50M	5	1
CN410	PQJP34A09Z	CONNECTOR, 34P	1	R462	ERDS2TJ562	5.6K	1
CN411	PQJP40A09Z	CONNECTOR, 40P	1	R463	ERDS2TJ472	4.7K	1
		(COMPONENTS COMBINATIONS)		R464	ERDS2TJ2R2	2.2	1
RA401	PQRS8B8332J	RESISTOR ARRAY	1	R465	ERG2SJ101	100	1
RA402	EXBP88472K	RESISTOR ARRAY	S	R466	ERDS2TJ390	39	1
				R467	ERDS2TJ102	1K	1
				R469	ER016CKF2561	256	1
POWER SUPPLY UNIT PARTS							
PCB6	PQWP6TD1232X	POWER SUPPLY BOARD ASS'Y (RTL)	1	R470	ER016CKF2701	2.7K	1
		(CHASSIS & ELECTRICAL PARTS)		R471	ER016CKF1522	15.2K	1
90	PQQT4164Z	CAUTION LABEL	1				
91	PQMC10053Z	SHIELD COVER	1				
92	PQMC10052Z	SHIELD CASE	1				
93	PQHR447Z	SPACER-A	1				
94	PQHR10178Z	SPACER-B	1				
95	PQHR10179Z	SPACER-C	1				
96	PQJS02R46Z	CONNECTOR, 2P	1				
97	PQJP04R07Z	CONNECTOR, 4P	1				
98	PQJP3A3Z	SOCKET, AC	1				
99	EST15304T	SWITCH, POWER	1				
100	PQMH10027Z	ANGLE, POWER SW	1				
101	PQJV3Z	HOLDER, FUSE	1				
102	XBA2C25TB0;	FUSE	1				
103	PQQT10469Y	FUSE LABEL	1				
		(ICs)					
IC400	POVISTK73908	IC	1				
IC450	POVISTK732C	IC	1				
IC451	PQVIHLD05003	IC	1				
IC452	PQVILA6500	IC	1				
		(TRANSISTOR)					
Q450	2SC4641	TRANSISTOR(SI)	1				
		(DIODES)					
D400	PQVDD5SB40	DIODE (SI)	1				
D401	PQVDERD3805L	DIODE (SI)	1				
D402	PQVDRD13FB	DIODE(SI)	1				
D450	PQVDRD6.2FB	DIODE (SI)	1				
D451	PQVDC25P30F	DIODE (SI)	1				
D452	PQVDC25P30F	DIODE (SI)	1				
D453	MA4057M	DIODE(SI)	1				
D454	PQVDD10SC4M	DIODE (SI)	1				
D455	PQVDD10SC4M	DIODE (SI)	1				
		(RESISTORS)					
R401	ERDS1TJ474	470K	1				
R402	ERDS1TJ474	100K	1				
R403	ERG3SJ683	68K	1				
R404	ER016CKF1801	1.8K	1				
R405	ERF5TKR22M	0.22	1				
R406	ER016CKF4700	470	1				
R407	ER016CKF5110	511	1				
R408	ERG3SJ101	100	1				
R409	ERDS1TJ104	100K	1				
		(CONNECTORS)					
				CN400	PQJP2D98Z	CONNECTOR, 2P	1
				CN401	PQJS07R50Z	CONNECTOR, 7P	1
				CN402	PQJP4D30Z	CONNECTOR, 4P	1
				CN403	PQJP4D46Z	CONNECTOR, 7P	1
		(COMPONENT COMBINATIONS)					
				CR400, 401	PQVDMGC4R3R2	COMPONENT COMBINATION	2

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Ref. No.	Part No.	Part Name & Description	Pcs
SCR450	PQVDTCSF5B41	(THYRISTOR) THYRISTOR	1
L401	ELF18D450M	(COILS) COIL	1
L400	ELF18D850C	COIL	1
L455	PQLE127	COIL	1
L450	PQLE128	COIL	1
L451	PQLE129	COIL	1
L452	PQLE72	COIL	1
L453	PQLE94	COIL	1
L454	PQLE94	COIL	1
T400	ETS42AB128AC	(TRANSFORMER) TRANSFORMER	1
PC400	PQVIPC817CD	(PHOTO ELECTRIC TRANSDUCER) PHOTO COUPLER	1
TH401	PQRD0WFL5R0	(THERMISTOR) THERMISTOR	1
F450	XBA1C40N1001	(FUSE) FUSE	1

FIXTURES AND TOOL

EC1	PQZZ64K2Z	EXTENSION CORD, 64P	1
EC2	PQZZ60K1Z	EXTENSION CORD, 60P	1
EC3	PQZZ50K2Z	EXTENSION CORD, 50P	1
EC4	PQZZ40K1Z	EXTENSION CORD, 40P	1
EC5	PQZZ34K1Z	EXTENSION CORD, 34P	1

Note:
Extension cords are useful for
servicing.
(They make servicing easy.)